MARCH, 1982
ISSUE NUMBER 43

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THE ORIGINAL MAGAZINE FOR TRS-80™* OWNERS

H & E COMPUTRONICS INC.

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PUBLISHER
Howard Y. Gosman

BUSINESS MANAGER
Steven M. Kahan

EDITOR-IN-CHIEF
Hubert S. Howe, Jr.

BUSINESS EDITOR
Peter Shenkin

MANAGING EDITOR
Martin Leffler

CONTRIBUTING EDITORS
Robert M. Richardson
Joseph Rosenman
Gordon Speer
Sherry M. Taylor
A. A. Wicks

ADVERTISING DIRECTOR
Kevin Rushalko

SALES MANAGER
Stacy Ann Allen

ART DIRECTOR
Edmund Khaleel

QUALITY CONTROL
Harvey Cohen

OFFICE MANAGER
Beatrice Kahn

SOFTWARE MANAGER
Darlene Bell

CUSTOMER SERVICE
Robert Williams

INVENTORY CONTROL
Michael Bernstein

SHIPPING MANAGER
Joan Marchick

PRODUCT DEVELOPMENT
Richard Kaplan

PRODUCTION
Adele Damiano
Louise Ann Kerins
Anna Mistrulli
Sheryl Streim

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BITS AND PIECES

Howard Y. Gosman

ON THE COVER

Can anyone learn to use a computer? It seems that children seem to have the easiest time learning the computer, mainly because no one told them that it's too hard to learn yet. Many new adult computer owners find that the computer is over their heads. In reality, Radio Shack has made it very easy to learn how to program. It seems that the only thing standing in the way of learning to program a computer is the preconceived notions of many owners that computers are only for geniuses.

How do you learn to program? Radio Shack has some pretty good beginner's books. All you have to do is tell yourself that you can do it and it can be done. Once you learn the BASICS, there are some good books like *Dos Random Access and Basic File Handling* that can teach you how to use your disk drives.

THE NEW RADIO SHACK POCKET COMPUTER?

As everyone already knows, **SHARP** is the manufacturer of the **RADIO SHACK POCKET COMPUTER.** Well, now Sharp has just released a new version of the pocket computer called the **PC-1500.** The new pocket computer has an amazing range of features including a new fast chip that makes basic execution time extremely fast (the current pocket

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The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is published by H & E Computronics, Inc., 50 North Pascack Road, Spring Valley, New York 10977. *The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is not sponsored, nor in any way officially sanctioned by Radio Shack, a division of Tandy Corporation.

The purpose of the *H & E COMPUTRONICS MONTHLY NEWS MAGAZINE* is to provide and exchange information related to the care, use, and application of the TRS-80™ computer systems. H & E COMPUTRONICS, Inc. does not take any financial responsibility for errors in published materials. Users are advised to check and edit vital programs carefully.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE encourages comments, questions, and suggestions. H & E COMPUTRONICS will pay contributors for articles and programs published in the magazine.

The H & E COMPUTRONICS MONTHLY NEWS MAGAZINE is typeset by Photonics, Ltd., 188 Highwood Ave., Tenafly, NJ 07670, and is printed by Kay Offset Printing Service, Inc., 154 Grand Street, New York, NY 10013.

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Don't miss a single issue of the new Eighty System Newsletter... published weekly and mailed every Friday by First Class Mail. This is the only publication designed for personnel in the TRS-80* industry, including manufacturers, distributors, dealers and computer users. The Eighty System Newsletter is compiled and edited by Ken Gordon, producer of the National TRS-80* Show, the Eighty/Apple Show, the NJ Microcomputer Show, and publisher of the Amateur Radio Equipment Directory. Here is valuable information in professionally prepared format about TRS-80* hardware, software, peripherals, trends in the industry, and latest news. In addition, each weekly issue contains brief digests of articles related to the TRS-80* system appearing in over 100 computer related and general interest publications. This bibliography will save you both time and money in keeping up with articles in print on the TRS-80* computer system. The Eighty System Newsletter is a must for all active TRS-80* users, plus anyone involved in any way with the manufacturing, distributing or retailing of TRS-80* products.

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THE CRYSTAL BALL

(News and Rumors of Interest to TRS-80™ Owners)

1. **IBM** is about to annouce a major series of business programs for its new **IBM Personal Computer.** We expect that there will soon be other competitors in this area as well. A business customer will be able to purchase several competing general accounting programs, including accounts receivable, accounts payable, general ledger, inventory control, and payroll. These are in addition to the Peachtree Software programs, which have been available since the IBM Personal Computer was announced.

In a related development, **Lifeboat Associates** is adapting all of its popular 8080 and Z-80 programs to the IBM Personal Computer, using IBM's disk operating system. These include **Word Star,** one of the most popular word processing programs.

2. **Apple Computer** is about to announce the development of a major hardware-based software protection device. It will consist of a serial number burned into a ROM which will be built into the computer. When the customer buys an expensive software package, the program will have to have the identical number built into it. If the comparison doesn't match, the software will automatically be erased from the diskette on which it is purchased. Tandy and other personal computer manufacturers are also looking into a similar device, but they are not planning on retro-fitting any of their existing computers with it. This item would only be for disk-based systems and software that would be sold on protected diskettes, similar to the present Model III SCRIPSIT diskettes.

The purpose of this device is to prevent software from being copied and distributed to persons who have not purchased it. This scheme has several drawbacks, however. First, customers who buy several machines would have to purchase multiple copies of the programs, and make sure that they use the correct copies on the correct machines. Second, a customer who buys the program could create an unprotected copy if he were to enlist the services of a machine-language programmer who could decode it. However difficult it would be to do the first time, once an unprotected copy existed, it could circulate through the "underground" and unscrupulous entrepreneurs could sell it for a fraction of the original price.

3. An important story in the annals of software piracy recently was concluded by the **Atari** company. A man named B. B. Roberts (an alias) sent out letters advertising that he would sell copies of several well-known personal computer software packages for the Atari computer, including even one that had not yet been released. He advised interested parties to send money to an address in Las Vegas. Besides offering pirated software, his letter attacked the programs' developers as vicious profiteers whose only motivation was to "get what the traffic will bear".

Atari took this threat seriously. They hired a private investigator who located Roberts within days and squelched his entire scheme. After consideration, however, Atari declined to prosecute. A company spokesman said, "It's not clear he committed a crime. He never cashed a check, and he never produced any software." As part of its agreement, however, Atari made Roberts write a complete account of his transgressions.

Atari leaves no doubt it will continue to police the software

continued on page 8

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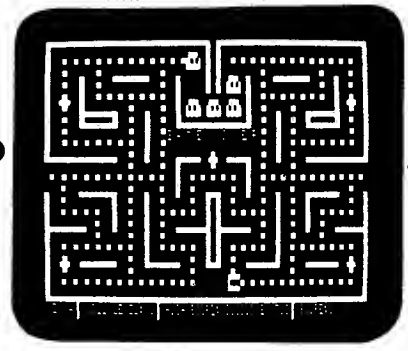

SCARFMAN

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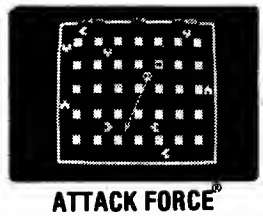

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continued from page 2

computer is very very slow!), more string variables and Boolean operations.

The **PC-1500** uses a 16-K read-only memory (ROM) that contains a greatly enhanced version of BASIC, compared to the original pocket computer. The random-access memory has been doubled to 3.5 K (compared to 1.6 K in the original pocket computer). An additional 4K of memory can be plugged in. The price of the new unit is $277 (plus $70 if you want the 4K additional memory). Yes, it does allow for two-letter variables and the use of two-dimensional arrays. Other features include Boolean operations (I bet you don't know what that is), a random-number generator, and a large number of statements including data statements, matrix dimensions, and three types of ON . . . GOTO statements. Also, a real-time clock has been built in and can be incorporated into programs.

The new printer sells for $231. Besides plotting capabilities, it can print in red, green, blue and black.

HAVE YOU BEEN HAD AGAIN?

You purchased your **MODEL I** and RADIO SHACK came out with a **MODEL III.** Now you purchased your pocket computer, and it has been replaced by another pocket computer that has more than the original for less money. What's going to happen next?

You didn't have to wait too long to find out. RADIO SHACK has just announced a new **16-bit personal computer.** The new computer is direct competition to the **IBM PERSONAL COMPUTER,** and is the probably replacement for the **MODEL II.** We don't have any additional facts at press time, but you will hear about it soon enough.

FREE NANOS TRS-80 REFERENCE CARDS

H & E COMPUTRONICS, INC. has been offering **FREE** software with each subscription or renewal to our magazine for the past four years. Last month, we offered all current subscribers the **NANOS SYSTEM REFERENCE CARDS** with their renewals. The response was fantastic, and now we have decided to make this same offer a permanent part of our new subscription advertisements.

Now, each new subscriber or current subscriber who renews his subscription can get the NANOS TRS-80 SYSTEM REFERENCE CARDS **FREE.** All you have to do is request the NANOS TRS-80 SYSTEM REFERENCE CARD when you subscribe or renew your current subscription. You will receive the reference card instead of our **FINCALC** cassette program.

The NANOS TRS-80 SYSTEM REFERENCE CARDS are complete summaries of all TRS-80 commands, all at your fingertips. It lists all BASIC commands and ASSEMBLY LANGUAGE COMMANDS. It also has all of the GRAPHICS codes listed, as well as a wealth of other information. All the information can be kept at your computer. The cards summarize most of the essential information in your TRS-80 MANUAL, so you can use the reference cards and store away your manual.

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TRS-80 MODEL II
TRS-80 MODEL III
TRS-80 COLOR COMPUTER
TRS-80 POCKET COMPUTER

Only the MODEL I and MODEL III cards include assembly language commands.

Only one set of NANOS TRS-80

continued on page 8

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continued from page 6

SYSTEM REFERENCE CARDS will be provided FREE of charge with your subscription or renewal. If you want an additional set of cards, the price is $4.95 (MODEL I), $5.95 (for all others). The NANOS cards will only be provided FREE of charge if you specifically request them with your subscription or renewal. If you order the cards at any other time, you must pay the above cost (plus our usual $3 for postage and handling per order). ■

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continued from page 4

market and will not hesitate to go to court when necessary to stop piracy of other infringements on its copyrights.

4. What's the market for personal computers going to be like during 1982? According to experts and professional studies, we can offer the following general predictions: **Radio Shack** and **Apple** will run neck-and-neck for the top spot, and each is likely to retain roughly its same share of the market. Since the competition is getting tougher, this means that both companies have to do more than mark time to stay in the same spot. It means that each company will sell over 100,000 of its most popular computers, and many more when all models are figured in. Both companies will increase their dealings in software and peripherals.

Many new competitors will make significant advances in the market. **IBM** expects to sell 150,000 personal computers. **Xerox** may sell at least half this number of its model 820, although some reports claim that Xerox is shooting at sales of 300,000 during 1982. Xerox is also planning on introducing other new models, possibly at a lower price. The **Osborne Personal Computer,** a substantial machine for a price of under $2,000, will also do very well, now that Osborne has landed a large contract with the Irish government. **Heath, Commodore, and Atari** will remain strong, and several Japanese companies expect to sell substantial numbers of machines in the United States this year, although no single company will match the performance of any of those mentioned above.

The biggest winner of all, however, will be the **Sinclair Personal Computer.** With its price starting at $149.95, over **one million computers** are expected to be sold during 1982!

5. Other hardware predictions: **eight-bit systems** (Intel 8080, Zilog Z-80, ad Motorola 6800) will continue to dominate the scene, but more and more 16-bit systems (Motorola 68000, Intel 8086 and 8088) will appear. It is possible that 1982 will see the introduction of the first **32-bit** personal computer (based on the Intel 432 microprocessor.)

As memory prices drop, **64K** will become the standard memory configuration for 8-bit computers, and even larger memories will proliferate for 16-bit machines.

New recording technologies will increase the capacity of 5-1/4 inch floppy disks to as much as **five megabytes.**

Increased competition will **force prices to go down even further,** with the magic barrier being a complete starting system (at least as much as, but probably more than you get with a 16K TRS-80 Model III) under $1,000.

6. Software predictions: **BASIC** will continue to be the dominant language, but new versions will come out that will eliminate the necessity of numbering each line and will incorporate better structuring of programs.

Disk operating systems will become more "user-friendly", with a resulting decrease in user errors

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LETTERS TO THE EDITOR

Questions about Diagnostic

In reference to Elliott Forman's review of the System Diagnostic program in the January 1982 issue, the manufacturer (Howe Software) is mentioned, but there is no address for the company.

Also, do the disk drive tests include a program which allows adjustment of the disk drive speed, if the speed is found to be in error, similar to the DDT Disk Drive Timer program by Disco-Tech or RPM by Prosoft? It sounds like it performs the same tests, but I am not certain that it does, and this is a factor for me to consider before making a purchase.

Daniel W. Arthur
915 Summit Avenue
Waynesboro, PA 17268

The System Diagnostic program does include a disk drive timer like those mentioned, as well as instructions for adjusting the speed for your disk drives.

The address for Howe Software is 14 Lexington Road, New City, NY 10956. The program can also be purchased through H & E Computronics. We regret these omissions.

Error in "Alien Invasion Force"

Several readers have pointed out an error in my program "Alien Invasion Force", which was published in your August issue. Apparently when the program was edited by *Computronics* for clarity, two lines were created out of what was supposed to be one. Line 115 should be deleted and tacked on to the end of line 110. Remember to delete all spaces in both lines first so that it will not exceed 255 characters when combined.

Andrew Braunstein
PO Box 442
Sharon MA 02067

Errors in Previous Letter

In issue #39 (October 1981) of your magazine, you published a letter that I had written (Dated 2 September 1981), which covered a method that TRSDOS users could incorporate to get a hard copy of their disk directories, and how to find the source names for Tiny PASCAL P-code files and Source Code files. However, somewhere along the line, whoever was typing this letter in to your system somehow managed to produce some bugs. The first is minor. It is in the PASCAL name-finding line. The '$' is missing out of MID in the line; 10 CLEAR 300: INPUT#-1,A$: PRINT MID$(A$,2,6). I am sure most readers have caught that one.

However, the other error will produce very unwanted results. In my explanation of how to divert video output data to a printer, you had published the essential line as POKE 16414,5:CMD"S". The only thing this will do is freeze the computer, making it about as useful as a broken air conditioner in Hell. If you will refer to that letter, you will see that it had been presented as POKE 16414,141: POKE 16415,5: CMD"S". Readers will find that this will do the trick.

I am sure that many of the TRSDOS owners in Computronics Land will find this useful. (Again, to reset video, either RESET or go to BASIC and key in POKE 16414,88: POKE 16415,4).

David R Goben
HHB 1/7 FA
Ft. Riley KS 66442

Sticking with Radio Shack

Over the past year, I have enjoyed reading the many fine articles that were published in *Computronics*, and I wish that the Model II Newsletter could be issued with the same regularity.

continued on page 10

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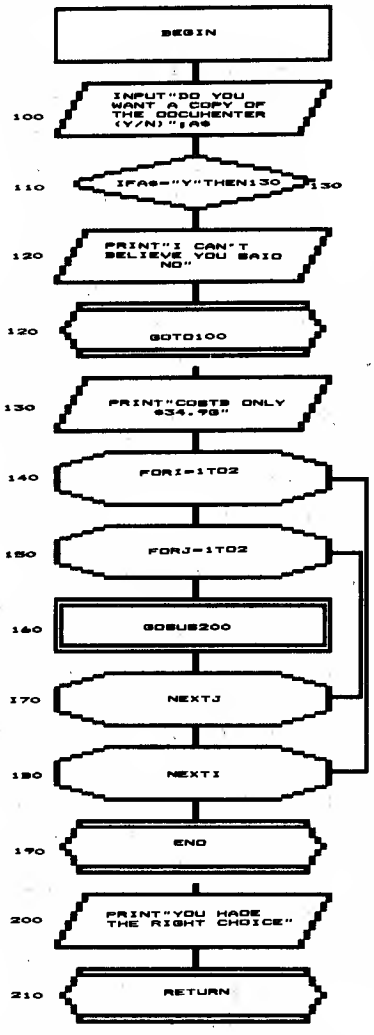

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Lilburn, Georgia 30247

continued from page 9

Some of the features that I found particularly interesting included the Book Reviews, the Beginner's Corner Section, which Sherry Taylor has taken over in fine style, and the Program Preview Articles, even though most of these did not directly apply to the Model II.

The most attractive part of the IBM Home Computer to me at this time is the 16 Bit Processing, as often I would like to speed my computer up. However, I seriously doubt if IBM will ever obtain the User Support that Radio Shack has developed from people like yourself, as well as their own staff and thousands of other users helping each other. I also fear that if this computer is not very successful for IBM, they might not even know that you exist after your purchase.

No plans for me to change from Radio Shack!

Jim Slade
101 Yorkshire Rd
Hoyt Lakes MN 55750

A Poem

I thought that you would really like
The article I sent you.
But, yet you haven't answered back.
I hope it hasn't bent you!
I feel your readers would enjoy
My future "recollection."
Please tell me if you yet have made
My piece your next selection!

And, in the meantime, kindly send
A copy — maybe two? —
Of COMPUTRONICS issues — so
I'll get a current view!

I trust that I've not asked too much?
Indeed, if that's the case,
Then tell me I should just lay off
And try a slower pace!

This writing thing is new to me.
I'm just a neophyte!
So, if I've broken protocol,
I hope you get me right!

Michael H Shadick
1515 S 4th St Apt E-4
Minneapolis MN 55454

Mr. Shadick's article "A 21st Century Reminiscence" has been accepted for publication in a future issue of Computronics.

Computer Club in New Mexico

Way out here on the Staked Plains of New Mexico, there has come together a dedicated bunch of computer enthusiasts who would very much like to exchange ideas with others of similar bent. We are new at the Club business, but some of us have been staring at CRT's and cussing machine-language programming for quite a while.

At our last meeting, the membership ganged up on me and directed me to pass on to you our address so that advertisers and fellow buffs could get in touch if they so desired. We meet on the second Friday of each month, conditions permitting, and would enjoy hearing from any and all.

As for equipment, we have a mixed lot. There are probably more TRS-80's than anything else, but we also have Apples, Heaths, Pets, and so on. In fact, we could probably find somebody in the club with more than a nodding acquaintance with almost any of the micros on the market.

Addrress your cards and letters to:

John L Peters
Llano LEstacado Computer Club
1509 Fairway Terrace
Clovis NM 88101

October 26, 1981

continued on page 12

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SPEED is the single most important factor in a dictionary program. All dictionary programs will find your potential errors but if the program is too slow, you are not likely to use it. ELECTRIC WEBSTER's speed is outstanding. It can proofread a several page letter in 20 seconds.

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"I have already found that the use of (MICROPROOF) has greatly enhanced the quality of my letters and reports. This is a very useful product and should be obtained by anyone who uses a word processor."
Michael Tannenbaum, CPA
80 Microcomputing, August 1981

"The summary review of this program? One word — Excellent. I highly recommend it for anyone using a word processor for any need — articles, manuals, reports, and even letters of substantial length."
A. A. Wicks - Program Previews
Computronics, September 1981

In a comparative review of proofreading programs (with smaller dictionaries), MICROPROOF was found to be considerably faster than all the others, when tested against a 400 word sample document.
Phillip Lemmons
BYTE Magazine, November 1981

"(MICROPROOF) operates with good speed and efficiency. A 1500 word document took 26 seconds to load, process, and proof when the program was run on a TRS-80 Model II under CP/M."
"Once the program is integrated, it is very friendly and any person able to use a word processing program can master it in moments."
Frank Derfler
Info-World, January 1982

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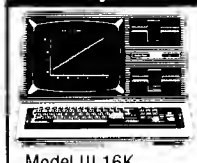

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continued from page 10

Radio Shack's Policies on non-RS Equipment

The following letter was sent to the President of a company that manufactures TRS-80 Model III computers with non-Radio Shack disk drives, as well as other TRS-80 compatible peripherals. It is in response to an article by another person on the same subject, which failed to mention certain items. Radio Shack has sent us a copy in the hope that it will clarify their policies to customers.

Warren G. Rosenkranz, President
VR Data Corporation
777 Henderson Boulevard N-6
Folcroft Industrial Park
Folcroft, Pennsylvania 19032

Dear Mr. Rosenkranz:

I have no intention of retracting my statement which I do not consider to be harsh or anti-competitive. My column served to provide some facts which I thought our owners needed to understand.

I have no argument with the third party manufacturers, but I do believe it is fair to explain to our customers, or would-be customers, those items which Mr. Green left out of his ad. They are simply that service is not as convenient as your local Radio Shack, that you have to install the product yourself, and that we no longer will service the equipment. In addition there is the matter of FFC certification and UL approval, which you did not address in your letter.

I also believe my column made it clear that I was referring to build-in products. Obviously add-on external devices do not void our guarantee, or prevent us from servicing our equipment, etc. Of course, the service issue is still a problem, and you know full well that a disk drive cannot be serviced by a neophyte if it requires any of the several critical mechanical adjustments.

I am sure you realize that our prices are the result of maintaining a chain of over 4,000 conveniently located stores, open long hours, that will accept in for service any of our products no matter where purchased and send them to one of our 1280 plus service centers. Our distribution system adds less cost than any other major manufacturer in this business, which is quite clear from our annual report. I grant you, the small manufacturer can operate for less and sell for less, but also deliver less service and convenience. All I want our customers to do is make a fair judgment as to the value of the service and convenience.

VR Data may be a fine company with a fine product. I really have no way to know. But are you willing to say that all of our competitors in the same business offer equal value and quality and will be able to stay in business?

Sincerely,

Jon Shirley
Vice President
Computer Products
RADIO SHACK ■

H & E Computronics welcomes letters on any subject. If you wish a personal reply, please enclose a self-addressed, stamped envelope.

H & E Computronics also welcomes readers to submit programs, articles, or reviews for publication. Please address correspondence to:
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H & E Computronics
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Spring Valley, NY 10977
Please submit programs on media (cassettes or diskettes). Also please indicate the system it was prepared on, and include any necessary instructions.

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Don't buy a spelling checker until you've considered Proofreader. Recently, several ads for other spelling checkers have compared themselves to "others". They weren't comparing themselves to Proofreader! Proofreader has all the features you need for checking your documents for spelling errors and typos. Proofreader looks up every word in its 38,000 word dictionary, and does not increase its "vocabulary" by using less accurate root word analysis like some others do. You won't need to spend as much time adding new words as you would with a smaller dictionary. Proofreader is easy to use -- you can start checking your documents immediately. Proofreader is fast -- it can check even your largest document (20 pages or more) in less than 5 minutes! Unknown words are listed on the screen, and can be saved in a file for later manipulation. The Proof-Edit feature (optional on the Model I/III version, included with Model II and CP/M) allows you to interactively correct the unknown words in context. New words can easily be added to the dictionary, and expansion is limited only by disk capacity. Proofreader works with all TRS-80 operating systems and word processors, so if you change systems, you won't need a new spelling checker. On the TRS-80 Model I/III, only 32K RAM and 1 disk drive are needed. Proofreader also works with all popular CP/M word processors. Add up the facts and the low price, and you will conclude that Proofreader is the best value available in spelling checkers.

Aspen Software programs are professional quality, reliable software tools developed for the TRS-80 and CP/M by a Ph.D. in Computer Science. All software is protected by Aspen Software's low cost upgrade privilege for new versions. Other tools include:

— SOFT-SCREEN™, a powerful, state of the art full screen text editor. Over a year in development, Soft-Screen is compatible with all TRS-80 programming languages, including BASIC, FORTRAN, MACRO, Ratfor, and COBOL. Commands are easy to learn, yet versatile and complete to satisfy the most experienced user. Soft-Screen is also available for P&T Model II CP/M.

— SOFT-TEXT™. Aspen Software's text formatter. When used with Soft-Screen, provides a powerful word processing system. Full featured, including automatic pagination, even and odd page headings, underlining, index generation, footnotes, support for advanced printer capabilities, and much more. Model I/III version supports serial printers at full speed. Soft-Text offers a real alternative for Model II TRSDOS users. Please write or call for more details.

— RATFOR, a structured language preprocessor for Fortran developed at Bell Labs. Aspen Software Ratfor is one of the best versions available, and the only one with a pretty printer option. Totally compatible with Microsoft F80. Includes several extensions, including "case", "string", and conditional compilation. User's manual contains all information needed to learn and write Ratfor programs. Requires FORTRAN.

— PP-RATFOR, a pretty printer. Automatically formats and indents Aspen Software Ratfor source programs. An essential program development tool.

	Model I	Model II (64k,1d)	Model III	CP/M (2.2,48k)	Manual only
Proofreader	$54.00(32k1d)	$119.00	$64.00(32k1d)	$129.00	$8.00
Proof-Edit	$30.00	incl.	$30.00	incl.	incl.
Grammatik	$59.00(32k1d)	$99.00	$59.00(32k1d)	$149.00	$8.00
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both	$74.00(48k2d)	$139.00	$84.00	$139.00	$15.00

IMPORTANT: Specify computer model, operating system, memory size, and number of drives when ordering! For CP/M, currently only 8" single density CP/M versions available. Please inquire about other CP/M disk formats. All TRS-80 versions available. Manual only orders can be applied to final purchase. CP/M prices are introductory.

Orders sent postpaid by first class mail. Terms: Cash, check, money order, VISA, or Master Card. NM residents add 4% tax.

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PROGRAM PREVIEWS

A. A. Wicks

This Month: FINPLAN & NEBS Forms Guide

Today's business executive, if blessed with precognition, could well be the millionaire of tomorrow, because success in business depends very much on making the right decisions at the right time. Unfortunately, the making or breaking of a business relies less on clairvoyance than on intelligent forecasting and business decisions.

And how can managers sharpen their business projection skills so that their decisions will at least have the strength of sound evaluations? Simply by using all of the financial and operational tools at their disposal in order to make reasonably secure observations of the future.

One of these tools, and an extremely important one at that, is the "Five-Year Plan." Most businesses, large and small, use such planning. Shorter and longer terms can also be projected of course, but shorter plans tend to be less of a forecast that they are just annual budgeting (which must be done in any case, and must be considered in any future planning, too). Longer plans are inclined to be straight "crystal ball" — the data are more guess and less facts. Naturally, all future assumptions are exactly that, even for next week; however, given enough input based on experience and good business judgment, it is really surprising how close some five-year plans work out in reality. But keep in mind that five-year plans should be made annually, not every five years!

The Hayden Book Company is offering a program (to be reviewed this month), that must be considered an excellent "tool" for a small business endeavoring to plan for the future. The program, called "FINPLAN," is presented in such a way that anyone owning a TRS-80 can definitely insure that all factors in his or her planning have been considered. As Hayden states, it is a ". . . model of your business . . . ," with the program doing all of the hard mathematical work, and you just feeding the computer your assumptions, varying them as much as you wish.

As an initial learning approach, the program and its accompanying excellently prepared manual considers that you are the owner-operator of "Jones Distributors." This fictitious company stocks thousands of inventory items, purchases and sells parts, manufactures parts and sells them, and sells skilled services. That should generally fit the profile of thousands of companies.

The program then takes you, the user, through an entire evaluation and projection by Jones. This provides familiarity with the program and its application, and you may then turn to your own company's plans, using the program to make your projections. If you don't like what you see, or if you want to develop a different approach, it is merely necessary to modify your input data for a new projection.

If this sounds like one of the many "calc" programs available, then this is not quite true. With them, you must develop your own format and calculations. FINPLAN has incorporated all of the projection factors within the program, and it is totally interactive. That is, the questions and statements are presented on-screen. For example, on "Internal Rate of Return," the statement, "How Many Cash Flows?" appears. The reply (e.g. "8"), is typed in, ENTER is pressed, and the next question is presented.

Let us examine in detail some of the material covered in the program, so that you may see if its thoroughness can assist you in your business.

The program commences by presenting a "Mode Selection" menu. This permits you to choose such inputs as: Review/Change Company Description; Review Base Year Data; Change Base Year Data; and Change Future Data. The output choices are: Balance Sheet, Earnings STatement, Analysis, and Charts. There is then a request for "First Year to Display" and "Second Year to Display." In the "get acquainted" mode you would select Jones Distributors Earnings Statement for the Years 1979 and 1980. Remember, all material presented will later allow you to substitute your company's data for Jones. The Statement is conventional, providing Net Sales, Cost of Sales Culminating in Gross Margin, and then Expenses — Salaries, Rent, Travel, etc.

As the data are read in from disk before computation, the variance between 1979 and 1980 in percent will take a brief moment to compute before the full screen presentation is made. This display (and others following) may be hardcopy printed, if desired. (Note: Please note particularly my comments regarding hardcopy printing, as given later in this review.)

These data, are for the present, drawn from sample data on the program disk. The text of the manual now carries through with a brief analysis of this Earnings Statement. Should you wish to inspect the data that the Earnings Statement is based upon, you return to the menu and select "Base Year Data." This will disclose that the data are based upon the many accounts that businesses will be maintaining. For example, Cash, Net Receivables, Inventories, Assets,

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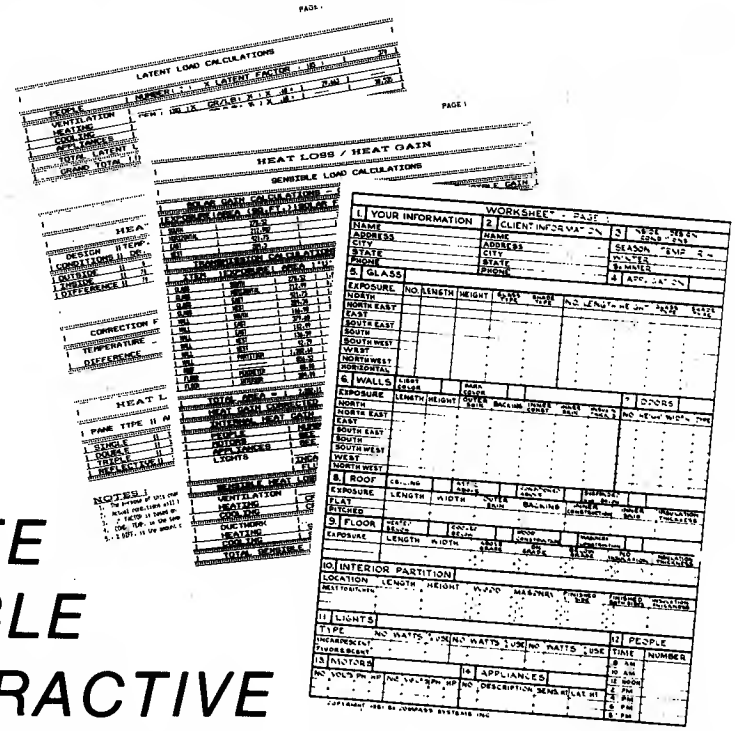

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etc., with dollar amounts indicated. Net Sales, Cost of Sales, etc. are also shown. All accounts are numbered, incidentally. Income and Expense accounts display assumptions as to Real Growth and Inflated Growth. Asset and Liability accounts show no assumptions of either growth. They will change, however, as a result of growth and inflation, depending upon income and expenses.

You may now look at Jones' growth between 1979 and 1984 by selecting these years from the menu. Once again, a computation occurs, and in a few seconds a new Earnings Statement is presented. Optimistically, the company is showing a very favorable growth pattern at this point, with pre-tax profits up 347.7 percent (the program does not guarantee similar results for you).

But with the good comes the bad. The program author has attempted to present a real situation in the example. And although it is conceivable that an astute business person might skip the example program and start using the program for his or her own purposes, it is not recommended. The "bad" is that 1984 projects a bank overdraft of several tens of thousands of dollars. Essentially, the computer has been following and calculating Jones' growth regarding Accounts Receivable, Inventories, and Current Payables. For instance, as sales increase, Accounts Receivable increase, and the difference comes out of Cash. As Costs of Sales increase, inventories increase, and this difference also comes out of Cash. And also, as Costs of Sales increase, Current Payables increase, and borrowed money, as it would appear, from suppliers, is also added to Cash disbursement. Sound familiar? Indeed, most businesses will be involved in such situations at some time or another. As a result, Jones' Balance Sheet now shows some negative factors on the screen display.

In order to review this problem, FINPLAN provides "Analysis," which shows what is happening between 1979 and 1984, with such categories presented as, Cash Flow, Current Assets/Liabilities, Percent Debt versus Debt Plus Equity, and Days Receivables — the ratio of Accounts Receivable to Annual Sales expressed in days of a 365-day year.

More Analysis data are presented — percent Gross Margin, percent Return on Sales, etc. At this juncture, Jones Distributors can make some new projections, changes and modifications to correct what could become a sticky situation. In other words, planning has shown some potential trouble-spots, and some changed assumptions are now in order. The manual now quite thoroughly discusses the options — reduce inventories, borrow, add to capital, and so on. The program itself permits, on a continuing interactive basis, the changing of initial projections. The manual scenario explores the alternatives for the future — incorporate? Possibly, and to consider this the menu choice of "Review/Change Company Description" is pursued. The manual and program, working together, offer some solutions to the Jones question, but decline to recommend any particular one, because there may be other solutions that can be provided by the user. In fact, should the program user care to go further, all sorts of conjecture may be entered, just to see what might happen to the Jones company.

In addition to the excercise just described, which takes up the bulk of the manual, graphical displays may be presented, Return on Investments may be thoroughly checked for effects on equity, and income tax is touched upon.

As this point is reached in the program, the second "Module" may be brought into operation, which allows you to calculate the return on investment percentage, and permits you to modify your assumptions as to depreciation life, depreciation method, etc. You may also calculate the rate of return on any investment, calculate depreciation by any of three methods, and calculate some tax data — all through this second Module. Although this will be used, as was the other Module, for your company, right now for demonstration purposes, the Jones organization continues as the sample.

This particular Chapter is complex, and the computations more so. But fortunately, the computer is doing the number-crunching, and although in some cases this will take up to a minute or so, the detail provided is well worth it. For example, taking internal rate of return as one of the complex calculations, it is computing what may be simply described as operating on the principle that money received now is worth more than money received later, and expenditures postponed now cost less than expenditures made now. Money received (or money not spent), may now be invested in something else. A lot of factors to consider indeed, and not for pencil-and-paper work. (A separate Appendix entry in the manual discusses in mathematical detail the subject of Internal Rate of Return. Sufficient to say, at this point the subjects of rates of return, depreciations and their effect on returns on investment, require three short sections in the manual.)

Once you have gone through this excercise using Jones as a model, you will probably be in an excellent position to apply FINPLAN to your own planning. You may also be rather tired of the exercise — it is that detailed — and even the author makes this comment.

Starting with your own Chart of Accounts, you may wish to change or add, as it would be only coincidental if your accounts perfectly matched the sample in FINPLAN, although they are very representative. It is quite possible to make such changes, either temporarily or for as long as you need. The method of doing this is extremely simple. Granted, you must enter the BASIC

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listing to do this, but the manual is so explicit that anyone with a total lack of knowledge of programming can do it, although they may not know what they are doing.

The remaining changes to fit your business are interactive ones with the computer, mostly based upon "yes-no" and "Enter Amount" types of dialog. Once all of the data you are concerned with has been entered, you can commence working with the program by making input changes to see what the end-result planning will be. For example, in the area of Inflation, you might try zero-change over your planning period (not likely, but a possibility). Then, try the plan with varying rates of inflation. To indicate what may occur, I would like to quote directly from the manual (in the case of Jones, again): ". . . We assumed zero real growth, no new borrowing, no new investments, and no changes in the base-year data. We wanted to see what rate of inflation would be necessary to run Jones 1979 bank balance of $8,673 down to nothing in the course of five years. The answer was 6.5 percent. As this is written, our country is experiencing general inflation of almost twice that. Then we asked how long it would take Jones to run out of cash, assuming 12 percent inflation and, again, no growth. The answer was: by the end of 1981 ! You might be better off than Jones, but you ought to find out." (This also serves to indicate the writing-style — nice, easy prose.)

Another example, this time with Capital Expenditures — new equipment or building expansion might be in your plans. FINPLAN will work through the implications with you, compute your rate of return after tax effects. You can compare the rate of return with the cost of borrowing. You can also include best-case versus worst-case in your comparison study. And so it goes — interest rates, emergency situations, inclusion of new product lines, possible incorporation.

Module II, as was briefly mentioned, provides four calculation routines, independent of the planning system — no need to load the first Module. The routines provided are: Return on Investment, Depreciation, Tax Computations as Corporate Income Tax without credits, and Federal Investment Credit. (The latter are arithmetical only, of course.) Displays and printing are tabular, headed, and nicely formatted.

The program has a number of error-trapping routines, mostly designed to protect you from your own entry-type errors. These reflect standard Level II BASIC Error Messages.

Several Exhibits make up the remainder of the manual — Assignment of General Ledger Accounts to FINPLAN (so that you can format your particular accounts into the overall FINPLAN concept), a short treatise on Internal Rate of Return, Federal Tax Computations as applied to FINPLAN for years beginning after 1979 — with instructions for making changes if they occur, and, two final Exhibits list all Variables and Constants used in FINPLAN, and a list of all Arrays.

The manual has been mentioned frequently in this review, and certainly it is a key element in the application of the program. If it were a mediocre manual the program would be useless. Far from it, the written material is very concise and extremely clear, and the exposition is presented in neat "bite-size" elements and chapters. This helps to make a rather complex subject an easy one to digest. The author is an expert in his art. Additionally, it is pleasant to read a well-printed document (what else would be expected from Hayden ?), excellent typesetting, and bound in a hard-cover, three-ring, plastic binder with a three-color sheet insert cover. Wherever dot-matrix printouts have been included as screen or printer examples, these are clear and sharp. A "10" for this manual, without reservation.

The program itself has been well thought-out, and attempts to reach as many business managers as possible. I cannot think of any business planner who could not benefit by its application to their situation — the program is equally applicable to established businesses, a new business, or a business venture or acquisition being contemplated. The type of reports the program can produce could very well be helpful at the bank too — bankers like to see neat projections, which serves to establish a business as being well-managed. The fact that no computer knowledge whatsoever is required for its use merits commendation in itself. I do not wish to make too much of this, but I would feel more comfortable if the author had devised a better way to have a naive user change the Chart of Accounts. Although, as has been stated, the explanation is clear as to the method of doing this, I feel the possibility of incorrect keystrokes in the compressed format program will be in direct proportion to the number of changes made to the Chart. This obviously could cause some operational problems.

At the beginning of this review, your attention was directed to a comment I am about to make regarding the hardcopy printing of the displays in this program. At every point in the program where a printed copy of the video display would be useful for study or pencilled-in changing before re-runs, the comment "Press 'P' to Print" appears. In my use of the program, a printout did not occur. At least not a useful printout — just line-feeds and occasionally some of the screen characters. As the program is in BASIC, I examined the listing, and determined that this was being caused by some peculiarity of the LPRINT command and its interaction with my printer — a Centronics 739. There were a few other line errors in the program also, so I wrote to Hayden, asking for their comments on this

continued on page 28

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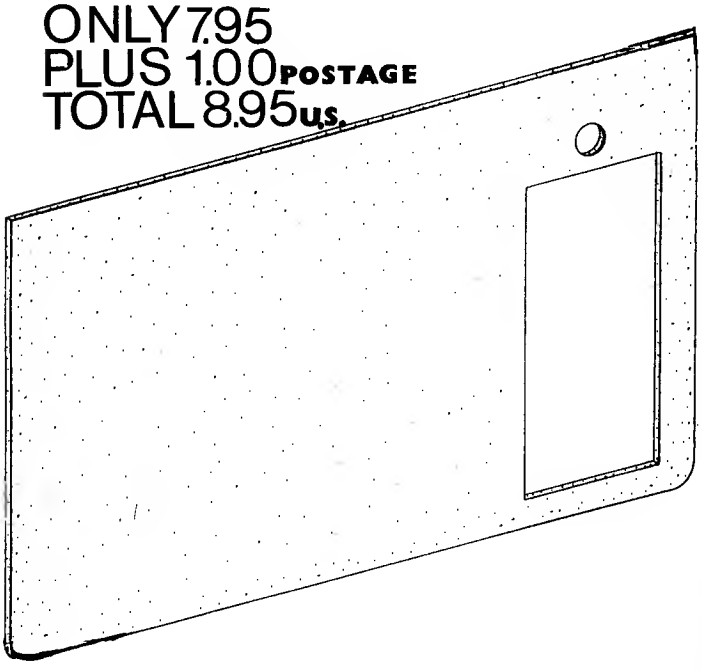

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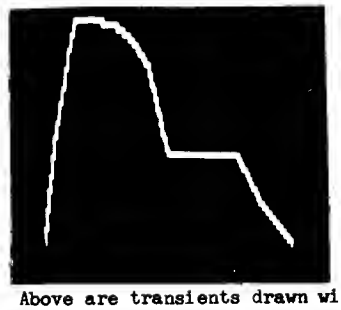

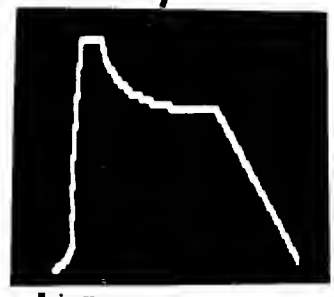

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BEGINNERS CORNER

Sherry M. Taylor

PERIPHERALS AND PARAPHERNALIA FOR THE TRS-80 (PART III)

With this installment of the BEGINNERS CORNER, we will continue our discussion of peripherals for the TRS-80. You will remember that our difinition of a peripheral was a device that is added to or works with a computer, but is not a part of the computer itself. There are many peripherals available for the TRS-80, and you may be interested in adding one or more of these devices to your system. Remember that if you want to get your money's worth, you must study the peripherals you are interested in and make some judgement as to whether they will serve your intended purpose. You have probably seen some of these items advertised in the various micro-computing magazines and may have wondered what on earth they do.

Would you belive that there is more than one way to skin a cat? You have heard that all your life, I would imagine, but did you know there was more than one way to talk to your TRS-80 computer? The method most of us use to communicate with our machines is by using the keyboard. We type in our commands in BASIC programming or answer questions generated by the program by using the keyborad. Well, is there another way? Could be.

One way is to use a "light pen." A what? No, that's not a pen that weighs just a little. It is an electronic marvel that looks like a pen except that it has a cord out the rear end that is connected to a computer port and a power source. (Port: A place of access to a system. The jack where your cassette cable connects to the computer is a port.)

The "light pen" has inside its barrel, a photo-sensitive diode or transistor. That is a gadget that can detect the presence of light. (It is a photo-diode in street lights that tells them that it is dusk now, so turn on the lights already!) The photo-diode in a light pen works the same way. When it detects light from the video display screen at the place you are pointing it, the pen sends an electronic signal to the computer port. The program is continuously checking that port for a signal and when it receives a signal, it does whatever you told it to do if it finds that signal.

For example, the program in which I have used a light pen is a Backgammon game. When playing, there is no need to touch the keyboard to indicate your moves. At each of the locations on the backgammon board is a little graphics square. When it is your turn to move, you point the light pen's opening at the square corresponding to the place from which you want to move your token. As you hold the pen on that spot, the little sqaures turn off and on again in succession. When the pen "sees" the square go off then on again, it signals the port. The program changes the square to an "X" and is now ready for you to indicate where you want to move the token to.

The light pen is usually connected to one of two ports: the expansion port or the cassette port. The one I have is connected through the cassette microphone jack. Also, you have to connect a 9-volt battery to the terminals provided to power the electronics inside the pen.

Light pens are sold with a page or two of instructions, and as with most things, some are good, some are not so good. One thing your documentation MUST cover, though, is how to program for the use of a light pen. Make sure that this is available before you buy. The reason is very simple: There are not a lot of pre-packaged programs available for use with a light pen. Therefore, you will be required to write the most of your programs

The light pens that use the cassette port utilize the BASIC statements INP(255) and OUT 255, where the number 255 refers to the cassette port. For those of you wondering, yes, this is also the correct port number for the Model III. (For those using the expansion port of the Model I the number used is 99.)

The command INP(255) makes the computer check the cassette port for an incoming byte-value from the light pen's signal. If the byte-value coming from the port is greater than 130, then the light pen sees light! If the byte-value is less than 130, it sees NO light. So, you would use a statement like this in your program:

```
IF INP(255)>130 THEN GOTO (the proper routine)
```

The use for the OUT 255 statement is to reset the light pen to the state it was before it saw light. (Use OUT 255, 4.) The circuitry LOCKS in the "saw light" condition, and therefore must be reset to the "no light" condition before the port is questioned again. It is important to reset the pen's circuitry before the questioning routine, because ANY light it sees will trigger the port. That includes light from a nearby lamp or from a window on a bright sunny day.

There are several applications for the use of a light pen, but the one I had in mind when I purchased mine was for games for a non-reading child. Sometimes the moves for some games take elaborate keyboard input, while the light pen gives the child the time to enjoy the game instead of trying to learn how to get all those

continued on page 55

NEW !!

SUPER UTILITY PLUS

— OVERVIEW —

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SUPER UTILITY PLUS was written by Kim Watt of Breeze Computing, Inc. and is the most powerful program of its kind on the market at this time. This program is a machine language, stand alone program that has its own I/O routines, does not use any ROM or DOS calls, and works on SINGLE or DOUBLE DENSITY systems. SUPER UTILITY PLUS performs such a wide range of varied tasks, that it may truly be called "The King of Utilities". It is not required that the disk be in any drive after initialization of the program and user may custom configure the program to suit his individual system requirements.

ZAP does everything your present "zapping" utility does plus many additional enhancements. It will operate on SINGLE or DOUBLE DENSITY systems and will work with most major operating systems that are presently on the market. It has dual cursors (one for ASCII and one for HEX side of the readout) and allows the user to go to the heart of the disk and read and/or modify data in HEX, ASCII, DECIMAL, BINARY, or OCTAL, regardless of whether it is a standard disk or not. The screen printout on Zap displays one sector at a time in HEX and ASCII (as other "zapping" utilities), but also tells user the true and relative track and whether the disk is IBM format or not. Zap also has a search routine that will locate the highest or lowest configured track on the disk and others that will search the disk for a byte list, ASCII string, word list, or even encripted code. Zap also allows you to display disk sectors, compare disk sectors, copy sector data, zero disk sectors, copy disk sectors, reverse sector data, sector searches, read ID address marks, or alter data address marks.

PURGE has a full screen editing kill control that allows you to kill files by positioning cursor and pressing one key. Also, Purge has several sub-utilities that allow you to zero out unused directory entries or zero out unused disk granules. In addition, user may kill files by naming the common category of the files (Example: /CMD/BAS/TXT <I>nvisible, <V>isible, etc. or even kill files that begin with a specified letter), and also may compute existing passwords, change the disk name, date, passwords, auto command, or even file parameters (name, passwords, protection levels). Lastly, Purge contains a complete disk directory that indicates all active and non-active files on the disk.

FORMAT is a utility that allows the user to format a disk with; standard format, format without erasing existing data, special format (custom format your disk most any way you want it), build a format track and optionally write it back to any track on your disk, and even contains a software bulk erase utility. The total formatting capabilities of this program are just about UNLIMITED and you may even reformat over a disk or add tracks to an existing disk without destroying existing disk data.

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DISK REPAIR allows you to automatically repair the HIT and GAT sectors, and will automatically repair a Boot. This utility also does a complete Directory Check and will advise you of errors that exist. In addition, this utility allows the user to recover killed files (if the file was killed by this utility or by NEWDOS), read protect or un-read protect the directory, move it to a different location on the disk, or clear unused entries. Lastly, this utility advises you of all inactive files that are on the disk.

MEMORY supplies the ability to display, move, test, compare, zero, exchange, input or output a byte to any port, exchange, jump to, reverse, fill, string search, or even load/write and entire track or sectors to/from memory.

FILE contains the abilities to display file sectors, compare files, copy files, disk directory, free space, file locations, drive status, create files, and clear files from disk. These utilities give you a wide range of powerful commands at your disposal to perform just about any function that you want with files up and including the complete reorganization of your entire disk with all the files re-written in their most contigious order.

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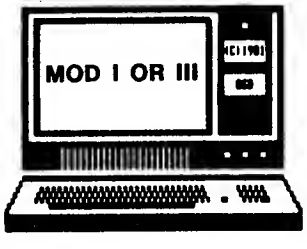

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Ricardo Gonzales, Jr.

This program is a decision tool for solving economic problems by analysis of compound interest payments. This program is unique, because it contains most of the economic computations that are normally required.

The program assumes that the user has a background in engineering economics and economic forecasting. However, any curious "hacker" should be able easily to master the proper use of the computations with a minimum of study.

The program continually cycles back to a decision table which enables the user to make a choice of several economic computations. If more information is desired, the user may choose to refer to a definition table. Also, the user has the power to refer to the definition table after each computation choice is made. This methodology is beneficial in two ways. First, the user may review the meaning of coded parameters. Second, the user has the option to stop a calculation, in case a better choice is desired. There is also an option built into "code No. 2" which allows an analysis based on an "internal" interest rate to be influenced by an "external" inflation pressure. The case for this computation is when "planned" future annual payments (e.g. maintenance costs) are found to increase with inflation. This calculation produces the resultant "new" present worth.

This program offers the experienced economic analyst a useful tool which will save time and motion. The program may also serve as a learning tool, because it contains diagrams and word descriptions which will reinforce the application of each formula.

This program combines, in an orderly manner, all the economic formulas that are usually used in economic studies. The "LPRINT" statements are meant for a Quick Printer.

```
100 REM                INTEREST FORMULAS,
110 REM            A COMPILATION OF SPECIFIC
120 REM              ECONOMIC CALCULATIONS
130 REM                       BY
140 REM              RICARDO GONZALES,JR.
150 REM                   10/28/80
160 REM
170 REM REF: PRINCIPLES OF ENGINEERING ECONOMY
180 REM      BY GRANT AND IRESON,
190 REM      ROLAND PRESS COMPANY (COPYRIGHT 1960),
200 REM      NEW YORK
210 REM
220 GOTO400
230 CLS
240 PRINT "DEFINITION TABLE"
250 PRINT
260 PRINT "P=PRESENT WORTH"
270 PRINT "S=FUTURE AMOUNT"
280 PRINT "R=ANNUAL PAYMENT"
290 PRINT "I=INTEREST RATE"
300 PRINT "N=NUMBER OF YEARS FOR ANALYSIS"
310 PRINT "G=GRADIENT"
320 PRINT "IE=VALUE OF INFLATING INTEREST RATE"
330 PRINT "  CA-SP= COMPOUND AMOUNT, SINGLE PAYMENT"
340 PRINT "  PW-SP= PRESENT WORTH, SINGLE PAYMENT"
350 PRINT "  SF-US= SINKING FUND, UNIFORM SERIES"
360 PRINT "  CR-US= CAPITAL RECOVERY, UNIFORM SERIeS"
370 PRINT "  CA-US= COMPOUND AMOUNT, UNIFORM SERIES"
380 PRINT "  PW-US= PRESENT WORTH, UNIFORM SERIES"
390 FOR X=1 TO 6000: NEXT X
400 CLS
410 INPUT "DO YOU WANT PRINTER OUTPUT?  YES(1) NO(0)";QQ:CLS
420 IF QQ<>1THEN450
430 INPUT "READY LINE PRINTER. DEPRESS 'ENTER', WHEN READY
CONTINUE";Q
440 CLS
450 GOSUB 3170
460 PRINT : PRINT
470 INPUT "WHAT ANALYSIS DO YOU WANT, ENTER 0 TO OBTAIN
DEFINITIONS";Q
480 IF Q=0 THEN 230
490 CLS
500 IF Q=1 THEN GOSUB 720
510 IF Q=2 THEN GOSUB 1300
520 IF Q=3 THEN GOSUB 580
530 IF Q=4 THEN GOSUB 1160
540 IF Q=5 THEN GOSUB 870
550 IF Q=6 THEN GOSUB 1010
560 IF Q=7 THEN GOSUB 1480
570 GOTO 2060
580 REM  CAF
590 GOSUB 2130
600 GOSUB 2100
610 INPUT "P,I,N";P,I,N
620 IF QQ=0THEN670
630 LPRINT "PRESENT WORTH";P
640 LPRINT "INTEREST RATE";I
650 LPRINT "YEARS";N
660 LPRINT "TO FIND S"
670 S=P*((1+I)^N)
680 IF QQ=0 THEN 700
690 LPRINT "S=";S
700 GOSUB 3670
710 RETURN
720 REM   PWF
730 IF Q=1 THEN 740 ELSE 750
740 GOSUB 2290
750 GOSUB 2100
760 INPUT "S,I,N";S,I,N
770 IF QQ=0 THEN 820
780 LPRINT "FUTURE WORTH";S
790 LPRINT "INTEREST RATE";I
800 LPRINT "YEARS";N
```

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- All labels optionally support an "Attn:" line.
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- Continuous display of numbers of labels/envelopes printed.
- Each disk entry automatically "remembers" how many mailings have been made for that particular entry...Can be tied in with purge/select.
- Primarily written in BASIC for easy modification... embedded machine code for those speed sensitive areas.
- Editing is simple and fast...automatic search.
- Supports the 9 digit zip code.
- Deleted entries have "holes" on disk filled automatically ...and alph. order is still maintained!
- Test label printing lets you make horizontal and vertical adjustments with ease.
- Optional "one time" mailing for some selected entries.
- Extensive use of error traps (both operator and machine induced)...even recovers from a power failure during a printout!...recycling on disk errors.
- Patch program allows you to upgrade the system to any DOS.
- Documentation manual available alone for $3.95.
- Hardware requirements: 32K, printer, and 1 or 2 drives.

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Provide your customers with a printed calendar (along with standard banker's holidays) of any month of any year...Useful in motivating history students. Holds the same fascination for students as a game. Tape only for Model I or III.

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```
SSSSSSSSS  TTTTTTTTT  OOOOOOOOO  PPPPPPPP        LL        OOOOOOOOO  OOOOOOOOO  KK    KK
SS     SS     TTT     OO    OO   PP    PP        LL        OO    OO   OO    OO   KK  KK
SS            TTT     OO    OO   PP    PP        LL        OO    OO   OO    OO   KK KK
SSSSSSSSS     TTT     OO    OO   PPPPPPPP  ======LL        OO    OO   OO    OO   KKKK
SSSSSSSSS     TTT     OO    OO   PPPPPPPP        LL        OO    OO   OO    OO   KKKK
      SS      TTT     OO    OO   PP                LL        OO    OO   OO    OO   KK  KK
SS    SS      TTT     OO    OO   PP                LL        OO    OO   OO    OO   KK  KK
SSSSSSSSS     TTT     OOOOOOOOO  PP                LLLLLLLLL OOOOOOOOO  OOOOOOOOO  KK    KK
```

FAST SORT (handles multiple dim. arrays) and ALPHABETIZER (disk only) $19.95

Interfaces to your own basic programs...sort with the speed of machine code but with the convenience of basic. Just use your disk to merge our short basic programs (with embedded machine code) with your own basic program. Follow our simple instructions to poke several values before making the user call from basic. The pokes will set up a sort of string, integer, single, or double precision arrays (also ascending or descending order). Use one of two programs to sort arrays of the form A(1) or A(Q(1))...The disk includes 8 simple basic programs that are ready to merge with the main sort programs. Use them for learning and evaluation...Also included is a ready to use basic program (already merged with the ORDER program). Use it to obtain a printout of alphabetized names. This program alone is worth $19.95.

Sample Sort Times

8 sec. for 1000 dbl. prec. numbers...50 sec. for 5000 integers. (Ours is one of the only alphabetizers that both ignores non alph. characters and treats upper and lower case alike.)

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```
810 LPRINT "TO FIND  P"
820 P=S*(1/((1+I)>N))
830 IF QQ=0 THEN 850
840 LPRINT "P=";P
850 GOSUB3280
860 RETURN
870   REM   SFF
880 GOSUB 2440
890 GOSUB 2100
900 INPUT "S,I,N";S,I,N
910 IF QQ=0THEN950
920 LPRINT "FUTURE WORTH";S
930 LPRINT "INTEREST RATE";I
940 LPRINT "YEARS";N
950 R=S*(I/(((1+I)>N)-1))
960 IF QQ=0 THEN 990
970 LPRINT "TO FIND R"
980 LPRINT "R=";R
990 GOSUB 3510
1000 RETURN
1010 REM   CRF
1020 GOSUB 2560
1030 GOSUB 2100
1040 INPUT "P,I,N";P,I,N
1050 IF QQ=0 THEN 1090
1060 LPRINT "PRESENT WORTH";P
1070 LPRINT "INTEREST RATE";I
1080 LPRINT "YEARS";N
1090 R=P*(I*((1+I)>N))
1100 R=R/(((1+I)>N)-1)
1110 IF QQ=0 THEN 1140
1120 LPRINT "TO FIND R"
1130 LPRINT "R=";R
1140 GOSUB 3430
1150 RETURN
1160 REM   CAF
1170 GOSUB 2680
1180 GOSUB 2100
1190 INPUT "R,I,N";R,I,N
1200 IF QQ=0 THEN 1240
1210 LPRINT "YEARLY PAYMENT RATE";R
1220 LPRINT "INTEREST RATE";I
1230 LPRINT "YEARS";N
1240 S=R*(((1+I)>N)-1)/I
1250 IF QQ=0 THEN 1280
1260 LPRINT "TO FIND S"
1270 PRINT : LPRINT "S=";S
1280 GOSUB 3590
1290 RETURN
1300 REM    PWF
1310 GOSUB 2780
1320 INPUT "I,N";I,N
1330 INPUT "IS THERE A GRADIENT, YES(1)  NO(0)";Q
1340 IF Q=1 THEN 1670
1350 INPUT "IS THERE AN INFLATION RATE INCLUDED, YES(1)
NO(0)";Q
1360 IF Q=1 THEN 1840
1370 INPUT "YEARLY RATE OF RETURN";I
1390 P=P/(I*((1+I)>N))
```

```
1400 IF QQ=0 THEN 1460
1410 LPRINT "INTEREST RATE";I
1420 LPRINT "YEARS";N
1430 LPRINT "RETURN RATE";R
1440 LPRINT "TO FIND P"
1450 LPRINT "P=";P
1460 GOSUB3350
1470 RETURN
1480 REM
1490 INPUT "PRESENT WORTH";P:INPUT "FUTURE WORTH";S
1500 INPUT "NUMBER OF YEARS";N
1510 IF QQ=0 THEN 1560
1520 LPRINT "PRESENT WORTH";P
1530 LPRINT "FUTURE WORTH";S
1540 LPRINT "YEARS";N
1550 LPRINT "TO FIND THE INTEREST RATE"
1560 CLS
1570 PRINT "PRESENT WORTH";P
1580 PRINT "FUTURE WORTH";S
1590 PRINT "YEARS";N
1600 PRINT "TO FIND THE INTEREST RATE":PRINT
1610 I=((S/P)>(1/N))-1
1620 IF QQ=0 THEN 1640
1630 LPRINT "I=";I
1640 PRINT "I=";I
1650 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
1660 RETURN
1670 REM
1680 CLS
1690 Z=0
1700 GOSUB 2890
1710 GOSUB 2100
1720 INPUT "CONSTANT R VALUE, GRADIENT RATE";R1,D
1730 R=D/I-(N*D/I)*(I/(((1+I)>N)-1))
1740 R=R1+R: IF QQ=0 THEN 1800
1750 LPRINT "CONSTANT R VALUE";R1
1760 LPRINT "GRADIENT RATE";D
1770 LPRINT "INTEREST RATE";I
1780 LPRINT "YEARS";N
1790 LPRINT "TO FIND P"
1800 P=R*(((1+I)>N)-1)/(I*(1+I)>N): IF QQ=0 THEN 1820
1810 LPRINT "P=";P
1820 GOSUB 3750
1830 GOTO 1470
1840 REM
1850 CLS
1860 Z=1
1870 GOSUB 2890
1880 GOSUB 2100
1890 PRINT
1900 INPUT "CONSTANT R VALUE (R1), INFLATION INTEREST RATE
(IE)";R1,IE
1910 P=0
1920 FOR M=1 TO N
1930 P1=R1*((IE+1)>M)
1940 J=1/((1+I)>M)
1950 P=P+P1*J
1960 NEXT M
```

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```
1970 IF QQ=0 THEN 2040
1980 LPRINT "YEARS";N
1990 LPRINT "INTEREST RATE";I
2000 LPRINT "NORMAL YR'LY RATE OF RETURN            ";R1
2010 LPRINT "INFLATION RATE";IE
2020 LPRINT "TO FIND P"
2030 LPRINT "P=";P
2040 GOSUB 3840
2050 GOTO 1470
2060 REM
2070 P=0:S=0:R=0:I=0:N=0:G=0:IE=0
2080 CLS
2090 GOTO 450
2100 INPUT "DO YOU WANT THE DEFINITION TABLE, YES(1)
NO(0)";Q
2110 IF Q=1 THEN 230
2120 RETURN
2130 REM
2140 FOR X=1 TO 3
2150 PRINT @(204+64*X),CHR$(80);
2160 NEXT X
2170 FOR X=460 TO 495
2180 PRINT @ X,CHR$(45);
2190 NEXT X
2200 X=94
2210 FOR Y=5 TO 21
2220 SET(X,Y): NEXT Y
2230 V=1
2240 GOSUB 3930
2250 PRINT @ 525,">>>>> I(DECIMAL)   N(YEARS)"
2260 PRINT @ (525+64),"TO FIND S"
2270 PRINT "COMPOUND AMOUNT (SINGLE PAYMENT) COMPUTATION"
2280 RETURN
2290 V=2
2300 GOSUB 3930
2310 FOR X=1 TO 6
2320 PRINT @(47+64*X),CHR$(83);
2330 NEXT X
2340 X=23
2350 FOR Y=13 TO 21
2360 SET(X,Y): NEXT Y
2370 FOR X=460 TO 495
2380 PRINT @X,CHR$(45);
2390 NEXT X
2400 PRINT @ 525,">>>>>  I(DECIMAL)  N(YEARS)"
2410 PRINT @ (525+64),"TO FIND P"
2420 PRINT "PRESENT WORTH COMPUTATION"
2430 RETURN
2440 FOR X=1 TO 6
2450 PRINT @ (47+64*X),CHR$(83);
2460 NEXT X
2470 FOR X=460 TO 495
2480 PRINT @ X,CHR$(45);
2490 NEXT X
2500 V=4
2510 GOSUB 3930
2520 PRINT @ 525,"<<<<< I(DECIMAL)  N(YEARS)"
2530 PRINT @ (525+64),"TO FIND R"
2540 PRINT "SINKING FUND COMPUTATION"
2550 RETURN
2560 FOR X=1 TO 3
2570 PRINT @ (204+64*X),CHR$(80);
2580 NEXT X
2590 FOR X=460 TO 495
2600 PRINT @ X,CHR$(45);
2610 NEXT X
2620 V=3
2630 GOSUB 3930
2640 PRINT @ 525,">>>>> I(DECIMAL)  N(YEARS)"
2650 PRINT @ (525+64),"TO FIND R"
2660 PRINT "CAPITAL RECOVERY COMPUTCTION"
2670 RETURN
2680 FOR X=460 TO 495
2690 PRINT @ X,CHR$(82);
2700 NEXT X
2710 X=94
2720 FOR Y=5 TO 21
2730 SET(X,Y):NEXT Y
2740 PRINT @ 525,">>>>>  I(DECIMAL)  N(YEARS)"
2750 PRINT @ (525+64),"TO FIND S"
2760 PRINT "COMPOUND AMOUNT COMPUTATION"
2770 RETURN
2780 X=23
2790 FOR Y=13 TO 21
2800 SET(X,Y):NEXT Y
2810 FOR X=460 TO 495
2820 PRINT @ X,CHR$(82);
2830 NEXT X
2840 V=4:GOSUB 3930
2850 PRINT @ 525,"<<<<<  I(DECIMAL)  N(YEARS)"
2860 PRINT @ (525+64),"TO FIND P"
2870 PRINT "PRESENT WORTH COMPUTATION"
2880 RETURN
2890 FOR X=460-64*4+4*4 TO 460-64*4+4*5
2900 PRINT @ X,CHR$(82);
2910 NEXT X
2920 FOR X=460-64*3+3*4 TO 460-64*3+3*5
2930 PRINT @ X,CHR$(82);
2940 NEXT X
2950 FOR X=460-64*2+2*4 TO 460-64*2+2*5
2960 PRINT @ X,CHR$(82);
2970 NEXT X
2980 FOR X=460-64+4 TO 460-64+5
2990 PRINT @ X,CHR$(82);
3000 NEXT X
3010 FOR X=460 TO 495
3020 PRINT @ X,CHR$(82);
3030 NEXT X
3040 X=23
3050 FOR Y=13 TO 21
3060 SET(X,Y): NEXT Y
3070 PRINT @ 525,"<<<<<  I(DECIMAL)  N(YEARS)"
3080 IFZ=1 THEN 3120
3090 PRINT @ 525+1*64,"TO FIND P"
3100 PRINT "GRADIENT COMPUTATION  - PW-US"
3110 GOTO 3150
3120 PRINT @ 525+64,"INFLATION FACTOR(DECIMAL)"
3130 PRINT @ 525+2*64,"TO FIND P"
```

```
3140 PRINT "ADDITIONAL INFLATION RATE COMPUTATION  - PW-US"
3150 REM
3160 RETURN
3170 PRINT @ 64+45,"SELECT"
3180 PRINT @ 10+128,"GENERALLY          TO            CODE"
3190 PRINT @ 10+192,    "GIVEN              FIND
        NUMBER"
3200 PRINT @ 10+320,    "  S,I,N         P (PW-SP)        1"
3210 PRINT @ 10+384.    "  R,I,N         P (PW-US)        2"
3220 PRINT @ 10+448,    "  P,I,N         S (CA-SP)        3"
3230 PRINT @ 10+512,    "  R,I,N         S (CA-US)        4"
3240 PRINT @ 10+576,    "  S,I,N         R (SF-US)        5"
3250 PRINT @ 10+640,    "  P,I,N         R (CR-US)        6"
3260 PRINT @ 10+704,    "  P,S,N             I            7"
3270 RETURN
3280 CLS : PRINT "FUTURE WORTH";S
3290 PRINT "INTEREST RATE";I
3300 PRINT "YEARS";N
3310 PRINT "TO FIND PRESENT WORTH"
3320 PRINT "P=";P:PRINT:PRINT:PRINT:PRINT
3330 INPUT "PRESS ENTER TO CONTINUE";Q
3340 CLS : RETURN
3350 CLS : PRINT "INTEREST RATE";I
3360 PRINT "YEARS";N
3370 PRINT "YEARLY RATE OF RETURN";R
3380 PRINT "TO FIND P"
3390 PRINT "P=";P
3400 PRINT : PRINT : PRINT : PRINT
3410 INPUT "PRESS ENTER TO CONTINUE";Q
3420 CLS : RETURN
3430 CLS
3440 PRINT "PRESENT WORTH";P
3450 PRINT "INTEREST RATE";I
3460 PRINT "YEARS";N
3470 PRINT "TO FIND R":PRINT
3480 PRINT "R=";R
3490 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
3500 RETURN
3510 CLS
3520 PRINT "FUTURE WORTH";S
3530 PRINT "INTEREST RATE";I
3540 PRINT "YEARS";N
3550 PRINT "TO FIND R"
3560 PRINT : PRINT "R=";R
3570 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
3580 RETURN
3590 CLS
3600 PRINT "YEARLY PAYMENT RATE";R
3610 PRINT "INTEREST RATE";I
3620 PRINT "YEARS";N
3630 PRINT "TO FIND S":PRINT
3640 PRINT "S=";S
3650 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
3660 RETURN
```


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```
3670 CLS
3680 PRINT "PRESENT WORTH";P
3690 PRINT "INTEREST RATE";I
3700 PRINT "YEARS";N
3710 PRINT "TO FIND S"
3720 PRINT : PRINT "S=";S
3730 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
3740 RETURN
3750 CLS
3760 PRINT "INTEREST RATE";I
3770 PRINT "YEARS";N
3780 PRINT "CONSTANT YEARLY PAYMENT";R1
3790 PRINT "GRADIENT RATE OF INCREASE";D
3800 PRINT "TO FIND P":PRINT
3810 PRINT "P=";P
3820 PRINT : PRINT : PRINT : PRINT : INPUT "PRESS ENTER TO
CONTINUE";Q
3830 RETURN
3840 CLS
3850 PRINT "YEARS";N
3860 PRINT "INTEREST RATE";I
3870 PRINT "NORMAL YEARLY RATE OF RETURN";R1
3880 PRINT "INFLATION RATE";IE
3890 PRINT "TO FIND P":PRINT
3900 PRINT "P=";P
3910 PRINT : PRINT : PRINT : PRINT : PRINT : INPUT "PRESS
ENTER TO CONTINUE";Q
3920 RETURN
3930 REM DOTS
3940 IFV=1 THEN K=94
3950 IFV=2 THEN K=93
3960 IFV=3 THEN 4050
3970 IFV=4 THEN 4050
3980 PRINT @ 65+45,CHR$(K);
3990 PRINT @ 128+35,CHR$(K);
4000 PRINT @ 128+40,CHR$(K);
4010 PRINT @ 192+25,CHR$(K);
4020 PRINT @ 192+30,CHR$( K);
4030 PRINT @ 256+15,CHR$(K);
4040 PRINT @ 256+20,CHR$( K);: GOTO 4140
4050 IFV=3 THEN K=94
4060 IFV=4 THEN K=93
4070 PRINT @ 384+15,CHR$( K);
4080 PRINT @ 384+20,CHR$( K);
4090 PRINT @ 384+25,CHR$( K);
4100 PRINT @ 384+30,CHR$( K);
4110 PRINT @ 384+35,CHR$(K);
4120 PRINT @ 384+40,CHR$(K);
4130 PRINT @ 384+45,CHR$(K);
4140 RETURN
```

Ricardo Gonzales, Jr.
1648 South Orchard Hill Lane
Hacienda Heights, CA 91745 ■

continued from page 18

situation. Their reply was very prompt and informative, but not to my liking. Their Software Editor confirmed what was suspected — upon the command "P" the program PEEKs at all video memory positions, and causes an LPRINT of the ASCII character string for positions where there is a character. Hayden stated in their letter that the 739 uses ". . . different character positions than most other printers." The word "most" used in that sentence is a relative one I feel, but unfounded statistics are unimportant in this case. What is important, I believe, is that if the program does not perform with all printers likely to be used by the average computer operator, then this should be stated in the program description as advertised. I know that, if I were looking for a program to do all of the very useful functions that this one does, I would definitely want to use my printer with it, and I would want to be informed beforehand that it would, or would not work with my printer — so the option to buy it or not would be mine to decide. Nor would I wish to be placed in the position of modifying the program to work with my printer after getting it, even if qualified. I feel very strongly that a prestigious firm such as Hayden should place a disclaimer on this program (". . . may not operate with all printers," or list those that will not work), or issue a recall and modify the program so that it will work with all of them. (I also tried printing using a friend's printer of another manufacture, with similar, but not identical results.)

Beyond this, and the other minor criticisms I have mentioned, this is an exemplary program. If you are not affected by the printer problem, or can work within its constraints if you are, then this program may very well be one of the most useful ones that you could have at your command.

FINPLAN - A Financial Planning Program for Small Business. Catalog No. 05108 Hayden Book Co. Inc. (Available through H. & E. Computronics). Requires TRS-80 Model I, Level II, 32K one-disk drive minimum. — $74.95 on disk.

*****

NEBS Guide - An item that may interest small business owners is a brief "Forms Selector Guide," published by NEBS Computer Forms, 78 Hollis Street, Groton, Mass., 01471. This guide is a cross-reference to computer hardware, software, and NEBS Computer Forms. There are a number of forms, checks, payroll forms, etc., listed, that are related to Models I and III, and the full address is included of all software companies producing software that can use NEBS forms. Copies of the guide may be obtained by writing to the above address.

A. A. Wicks
30646 Rigger Road
Agoura, CA 91301 ■

ASSEMBLY LANGUAGE FOR RANK BEGINNERS (PART I)

Joseph Rosenman

Yes, Assembly Language. Those strange, unpronouncable commands with all those funny numbers. If you are a TRS-80 user who owns a Model 1 or 3 TRS-80 (with at least 16K), who knows "something" about Level II Basic but nothing else about Assembly Language or Machine Language, this article is for you. Several years back, Computronics published an excellent series on Z80 Assembly Language programming by Dr. Hubert Howe (also published in a book). In this series of articles, I will hopefully bring the beginner to the point where the general concepts of machine and assembly language will be understandable. Once the reader is familiar with the material being presented in this series, they will be ready for the book or articles by Dr. Howe, which cover the use of the Z80 Assembly language on the TRS-80 Model 1 in detail. After I have completed the Z80 series, I intend tentatively to begin a series on the 6809 microprocessor used in the TRS-80 Color Computer.

Before I go on, I had better define "Microprocessor", "Z80", "6809", "Assembly Language", and "Machine Language".

Microprocessor: The "thinking" part of a microcomputer. Microcomputers usually are contained in a small number of IC chips (between 1 and 3), and operate with an 8 bit data path, and 16 bit address path. Today, there are "mini-micros" with 16 bit data paths, and even "maxi-micros" with 32 bit data paths and extended address sizes. The microprocessor is the heart at the center of the computer: everything goes through the processor, and is controlled by it.

Bit: A BInary digiT. A single number in the base 2 system, that can have the value 0 or 1. All computer numbers are stored in binary.

Byte: An eight bit number. The basic unit refered to in microcomputers (and often in larger computers as well).

Z80: A microprocessor designed and manufactured by the Zilog company, that is upward compatible with the Intel 8080 microprocessor. This means that whatever works on the 8080 will also work on the Z80, but the Z80 has additional capabilities. The Z80 is used in the TRS-80 Models 1, 2, and 3, as well as many other microcomputers.

6809: A microprocessor designed and manufactured by the Motorola company and used in the TRS-80 Color Computer.

Assembly Language: A special language that simplifies "Machine Language" programming. In Assembly language, there is a "one to one correspondance" between Assembly Language "Mnemonics", and "Machine Language Instructions". If you want to know more, read on.

Machine Language: The actual binary number "codes" that cause the computer to do specific things (such as move numbers, add numbers, compare numbers, etc.).

A computer can do marvelous things, but it actually works very methodically and simply. Indeed, we are going to be studying the simplest and most basic level of the computer. But what is a computer? Since there are so many different types of computers, it can be hard to understand in general what makes a computeb a computer. There are characteristics that all computers share, however. First of all, every computer must be able to perform basic arithmetic and logical operations, and make "decisions" based on the results of the arithmetical and logical operations. Basic arithmetic means the addition and subtraction of integers. Logical operations are frequently unknown to the average beginner, and so will be taken as a special topic of this series. Decision making includes such things as testing for positive or negative, zero or non-zero, etc. Note that implied in the above definition, is the ability to represent numbers in some specific fashion.

The next characteristic of computers is the ability to store a program. This means that there is a place in every computer where the special machine language codes are kept. Usually, this area is called "Memory". It also must be possible for the "processor" of the computer (the "thinking" portion) to examine specific values of the program in memory. This implies that each machine language code is in a specific location (known as an "address").

The third characteristic of a computer is the ability to store the "DATA" a program uses. Data is any information (whether changing or not) that the program "operates" on. The program explains what to program has taken, or the information the program uses in order to perform some action. The computer is the thing that actually performs whatever actions are required.

The fourth characteristic involves the ability of the computer to communicate with the outside world, known as "Input" and "Output". In the beginning, the computer was given "Input" through a card reader, the computer was given "Input" through a card reader, using punched computer cards. "Output" usually was on a printer. Of course, things have gotten better since then. Today, we usually use a typewriter like keyboard for input, and a CRT (Cathode Ray Tube)

display for output. The different devices that can be used for Input and or Output (or I/O) are known as "peripherals".

There is a fifth "optional" characteristic of computers, known as "mass storage". While this characteristic is not necessary to define a "minimal" computing system, nearly every general purpose computer of any value will have some form of mass storage. Common examples include cassette tape and floppy disk. In all cases, mass storage also falls under the catagory of I/O.

In summary, the five catagories are:

1) Decision Making
2) Program Storage
3) Data Storage
4) Input/Output
5) Mass Storage

The fact that Program storage and Data storage are considered separately, is a throw back to the days when computers were first appearing. Originally, (I believe), there were separate memories maintained for the two "types" of information. Today, memory is combined into a general "pool" of available memory. This doesn't mean that program instructions and data can't be maintained in different parts of memory. In fact, some larger computers do maintain different areas of memory for this purpose. It is possible to "protect" memory in various ways, so that the instructions can have one type of protection, and the data might have another. Interestingly enough, however, the distinction between program memory and data memory has become more relevant in recent years. Often, it is desirable to save certain types of programs in a specially protected type of memory, called ROM (Read Only Memory).

The two types of memory commonly available are known as ROM and RAM (Random Access Memory). With RAM, it is possible to write information and read information. With ROM, it is only possible to read information (though, of course, the information had to be written when the ROM was first made). RAM is known as "volatile" memory, and ROM as "non-volatile" memory. Another difference between ROM and RAM is that RAM requires continuous power in order to "remember" what ever was stored there, but ROM "remembers" whether it has power or not.

You might have heard of two different types of RAM, "Static" and "Dynamic". Static means that the numbers stored in memory will remain the same as long as power is applied to the memory chips. Dynamic means that the values stored are only "temporary", and will be lost if they are not repeated within a short space of time (usually measured in milliseconds). The process of maintaining the values in dynamic memory is known as "memory refresh". Memory can either be refreshed as a special function of the microprocessor, by special hardware, or by "stealing" CPU (Central Processor Unit) time to perform the refresh (also known as "cycle stealing"). The Z80 microprocessor provides a special circuit that causes memory refresh without using normal CPU time. The TRS-80 uses dynamic memory, so the problem of refresh had to be solved by th designers of the computer. Why use dynamic memory at all? Dynamic memory requires very little electricity to operate, and tends to be inexpensive. Static memory requires a significant amount of electricity, and is more expensive. Confused? Don't worry. In order to understand Assembly Language programming, it isn't necessary to understand the differences between Static and Dynamic memory. It is important, however, to become (generally) more familiar with the "innards" of your computer. It is also important to take all of the acronyms and "buzz words" in stride. Most people find that they pick up all of the important words without even thinking about it.

What do you need to learn Assembly Language Programming? Of course, you will need a 16K (or more) TRS-80. In addition, you must have a copy of the EDTASM Editor/Assembler program sold by Radio Shack. Beyond that, patience and a lot of trial and error work! To begin with, patience. The first step is to learn about the the special number system that your computer understands: Binary.

Binary means "two". The Binary number system is the base two number system. OK, now what do I mean by "base"? To understand other number systems, first let us examine the one we are all most familiar with, the Decimal system—base "ten". The first thing to get used to, is the fact that zero is also a number. Zero represents nothing. So we have a total of 10 different types of numerical symbols—the digits 0 to 9. In the decimal system, it is possible to represent any quantity from 0 to 9 with a single digit. As soon as we want to represent a large number, we need an additional digit.

Consider the next number, 10. Ten is a combination of 1 and 0. The number 9 only requires one column, and 10 requires two. Since we add a column for the tenth number, the system is known as the Decimal system, or base 10. New columns are added at every power of 10. In other words, we start the second column at 10, the third at 10*10 or 100, the fourth at 10*10*10 or 1000, and so on. Each new column is ten times the value of the column to the right. In decimal, the number 123 means: 1*100 + 2*10 + 3*1, or 100 + 20 + 3, or 123.

Whatever the base you are using, the general rules are the same. There must be the same number of numerical symbols as the base number (i.e., 10 for decimal, 2 for binary), and each successive left column represents the next "power of the base". In Decimal, we can speak of the one's column, the ten's column, the hundred's column, the thousand's column, etc. They are "decoded" by multiplying whatever number

is in the appropriate column by: 10 to the zero power, 10 to the first power, 10 to the second power, 10 to the third power, etc. It probably sounds obvious, but by understanding how we interpret the meaning of 6437, we can understand how to understand numbers in other base systems. Since the 6 is in the fourth column, we use the formula of 6 * (base to the third) = 6000. The 4 is in the third column, so we use 4 * (base to the second) = 400. The 3 is in the second column so we use 3 * (base to the first) = 30. Finally, the 7 is in the first column so we use 7 * (base to the zero) = 7.

```
  6000
+  400
+   30
+    7
------
  6437
```

What would happen if I said that 6437 is in base 8, and I want to know what the equivalent number in Decimal would be? First, we must note that the numerical symbols in base 8 (also known as Octal) are: 0 1 2 3 4 5 6 7. The number 8 in decimal is 10 in Octal. You want proof? OK, watch:

1 * (base to the first) = 1 * (8) = 8,
0 * (base to the zero) = 0 * (1) = 0,
8 + 0 = 8.

The trick is to decode each column separately, then add together the results. So, for 6437:

```
6 * (8 to the third)   = 6 * 512 = 3072,
4 * (8 to the second)  = 4 *  64 =  256,
3 * (8 to the first)   = 3 *   8 =   24,
7 * (8 to the zero)    = 7 *   1 =    7,
                                  ------
        Octal 6437  =  Decimal 3359
```

Now, on to Binary. In Binary, the columns are all powers of two. The easiest way to work with Binary is to become aquainted with the powers of two right from the start. Thus:

1 2 4 8 16 32 64 128 256 512 1024 4096

are the numbers you will soon know so well. Let's examine some binary numbers:

16	8	4	2	1	
0	0	0	0	0	= 0
0	0	0	0	1	= 1
0	0	0	1	0	= 2
0	0	0	1	1	= 3
0	0	1	0	0	= 4
0	0	1	0	1	= 5
0	0	1	1	0	= 6
0	0	1	1	1	= 7
0	1	0	0	0	= 8
0	1	0	0	1	= 9
0	1	0	1	0	= 10
0	1	0	1	1	= 11
0	1	1	0	0	= 12
0	1	1	0	1	= 13
0	1	1	1	0	= 14
0	1	1	1	1	= 15
1	0	0	0	0	= 16
1	0	0	0	1	= 17
1	0	0	1	0	= 18
1	0	0	1	1	= 19
1	0	1	0	0	= 20
1	0	1	0	1	= 21
etc.					

Now, the general unit used in microcomputers is known as the "byte". A byte is a number made up of 8 bits. Therefore, the largest binary number is 1111 1111 (it is a common convention to split binary numbers into groups of four digits). So:

```
1 1 1 1   1 1 1 1
1                 = 1 * 2 to the 7 = 128
  1               = 1 * 2 to the 6 =  64
    1             = 1 * 2 to the 5 =  32
      1           = 1 * 2 to the 4 =  16
        1         = 1 * 2 to the 3 =   8
          1       = 1 * 2 to the 2 =   4
            1     = 1 * 2 to the 1 =   2
              1   = 1 * 2 to the 0 =   1
                                     -----
                                       255
```

This means that the value of a byte can be anything between 0 and 255, or a total of 256 different values. Microcomputers can, as a rule, operate on numbers as large as 16 bits. The largest value that can be contained in 16 bits is 65535 (in Decimal). Even so, microcomputers are "byte" oriented. Although there are no fixed rules, you will usually find that:

Microcomputers are based on an 8 bit value, and can operate on 16 bit values.

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MODEL III CORNER

Hubert S. Howe, Jr.

This Month: Understanding TRSDOS (Part I)

Radio Shack's TRSDOS version 1.3 for the TRS-80 Model III may well be the most powerful Disk Operating System yet released by Radio Shack. It seems to combine many features of the Model II TRSDOS as well as a general orientation derived from the Model I TRSDOS. Following the release of TRSDOS 1.3 and its updates, Radio Shack has even released a new version of the Model I TRSDOS, version 2.3B, which offers many of the newer commands first implemented on the Models II and III.

When you look into the more technical aspects of TRSDOS 1.3, you will see that the system has been completely rewritten. There are so many changes from the Model I that it is difficult for someone whose only experience has been on the Model I to start using the Model III without a certain amount of reorientation. Furthermore, in spite of the generally good documentation for the Model III, many details are missing from the manuals. (Is your copy still marked "Preliminary Version"?)

With this column, I will be beginning a series (not necessarily to be continued each month) on technical aspects of the TRSDOS 1.3 Disk Operating System, trying to concentrate on materials not generally known about both the DOS and the computer. If you have any questions you would like to pose for consideration in this space, they would be most welcome.

One of the important aspects about the TRSDOS system diskette is that, unlike the Models I and II, where all system information was stored in files which had the extension "SYS", the Model III system disk has that same information but NOT stored in files. Rather, it is just expected that certain tracks and sectors of the diskette are reserved for special informqtion. The contents of these tracks and sectors are otherwise identical to regular command (CMD) or system (SYS) files. One difficulty of this approach is that it is hard to patch the system to correct errors. With the Model I's approach, a defective file could simply be replaced by a new file with the same name. (This fact has been alluded to in the corrective information published by Radio Shack in its *Newsletter.)* Another difficulty, which will be the main subject of discussion in this column, is simply finding out what is on the diskette, what it does, and any special problems associated with certain features.

The TRSDOS 1.3 diskette that you receive from Radio Shack (they all seem to be identical) contains three visible files (LPC/CMD, MEMTEST/CMD, and HERZ50/CMD), three invisible system files (BASIC/CMD, CONVERT/CMD, and XFERSYS/CMD), and eighteen modular sections that would otherwise be referred to as system files but which are not in this case. Since we don't have names for any of these files, I have simply numbered all the "files" on the diskette from 1 to 24, depending on their physical order of appearance on the diskette. If you perform a FREE operation, you will see that the basic system occupies tracks 0 through 5 and tracks 15 through 21. (Only the first 12 sectors of tracks 5 and 21 are used.) Some of these contiguous blocks of data span more than one track. Table 1 shows the entire contents of the system diskette, indicating file number, starting and ending track and sector, length, name or function of the program (where known), and starting, ending and entry addresses, in hexadecimal. (All addresses in this column will be referred to in hexadecimal.)

Before discussing these files in some detail, let us note some general features about the DOS and its use of memory. The DOS consists of a module which I will refer to as the "nucleus", which is loaded into memory on power-on or reset and left intact, together with a number of additional modules, which are "overlaid" between locations 4E00 and 5200. "Overlay" is a technical term which means that this portion of memory is overwritten by the system as different programs are brought in to perform different applications, such as to open a file, read a sector, write a sector, etc. Only one such operation can be handled by the system at a time, so the memory that these programs use can be shared. Furthermore, while the above table doesn't give a clue to this fact, the portion of RAM from 4D00 to 4DFF is used as a 256-byte buffer for disk input and output operations. (In fact, just about all of RAM below this address is assigned to various and sundry specific applications that will be discussed at another time, under the subject of the memory map of the Model III.)

The overlay modules consist of files 14, 15, 17, 18, and 24, and it is important to note that these files do not use memory above 5200, so that is the lowest possible starting location for user programs that might want to perform disk input and output. Note that MEMTEST, for example, relocates to low RAM, because it does not use the disk.

The modules used most frequently by the system are located on tracks 15 through 21, surrounding the disk directory (abbreviated DIR), which is on track 17. The first two files are read only once, and the second two infrequently. If you delete everything with a file

File	Start & End Track (Sector)	Length (Sectors)	Program	Start-End-Entry Addresses
1.	0 (1) - 0 (1)	1	BOOT	4300-43FF-4300
2.	0 (2) - 0 (15)	14	LOW RAM	400C-5219-4E00
3.	0 (16) - 1 0(6)	9	DEBUG	4E00-5563-52B9
4.	1 (7) - 2 (6)	18	BACKUP & FORMAT	4E00-5D71-57A1
5.	2 (7) - 2 (9)	3	?	8000-803B-8000
6.	2 (10) - 2 (12)	3	unused	
7.	2 (13) - 3 (15)	21	BASIC/CMD	4152-41E5, 5200-64DC-5200
8.	3 (16) - 4 (9)	12	CONVERT/CMD	5200-5AFF-5200
9.	4 (10) - 4 (15)	6	XFERSYS/CMD	5200-5528-5200
10.	4 (16) - 4 (18)	3	LPC/CMD	7000-7058-7000
11.	5 (1) - 5 (9)	9	MEMTEST/CMD	6000-67BB-6000
			relocates:	4300-4A5C-4300
12.	5 (10) - 5 (12)	3	HERZ50/BLD	(DO FILE)
13.	15 (1) -15 (6)	6	BASIC ERROR MESSAGES	4E00-51D2-4E00
14.	15 (7) -15 (12)	6		4E00-51AE-4E00
15.	15 (13) -15 (18)	6		4E00-51D2-4E00
16.	16 (1) -16 (6)	6	DOS COMMAND INTERROGATOR	4E00-51F2-4E00
17.	16 (7) -16 (12)	6		4E00-5139-4E00
18.	16 (13) -16 (15)	3		4E00-500C-4E00
19.	16 (16) -16 (18)	3	DOS ERROR MESSAGES	4E00-5DE7-4E00
20.	18 (1) -18 (18)	18	DOS COMMAND EXECUTOR (1)	5200-6240-5200
21.	19 (1) -19 (18)	18	HELP	4E00-5F85-4E00
22.	20 (1) -20 (15)	15	DOS COMMAND EXECUTOR (2)	5200-60BE-5200
23.	20 (16) -21 (9)	12	DOS COMMAND EXECUTOR (3)	5200-5BA2-5200
24.	1 (10) -21 (12)	3		4E00-4FAD-4E00

TABLE 1: *Summary of files on TRSDOS 1.3 system diskette.*

name that appears in the directory (from BASIC to HERZ50, but you would have to know the passwords for BASIC, CONVERT, and XFERSYS), you will find that the lowest usable track and sector is track 2, sector 13, where BASIC begins. Out of 68 granules occupied by the system (excluding BOOT and DIR, which are reserved on all TRSDOS-compatible diskettes), only 18 can be recovered in this manner. That leaves a BIG system.

Now that we have laid out the area a bit, let us discuss some details about the individual files and what they do.

BOOT is a *bootstrap loader* program. It is read in by software in the ROM activated when the reset button is pushed, and its function is only to read file 2 into memory and then jump to it. File 2 then takes over and brings up the rest of the system. BOOT is the only file stored as "data". That is to say, all other programs are stored in blocks where the length and starting address are indicated first. BOOT must automatically be read into location 4300.

File 2, indicated above as LOW RAM, is the *nucleus* of the Disk Operating System. It consists of a small amount of data that is written over locations 400C to 42FF (the RAM initialization for non-disk systems, which is performed by the ROM reset routine before BOOT and the DOS is read in off the disk) and a large continuous amount of data read in from 4400 to 51F0.

File 3 is simply the DEBUG program. Note that it occupies up to location 5563, so that no program residing below this location can be debugged.

File 4 executes both the BACKUP and FORMAT operations. It is logical to group them together, since BACKUP must first format the diskette, and neither can be run while the computer is executing any other program.

Files 5 and 6 are mysteries. File 5 contains a short incomprehensible program, and file 6 is completely blank, but this space on the diskette cannot be used. This area has probably been reserved for future patches to the system.

The functions of BASIC and CONVERT are known to most users. BASIC occupies through location 614D, meaning that nearly 25K of the computer's 64K address

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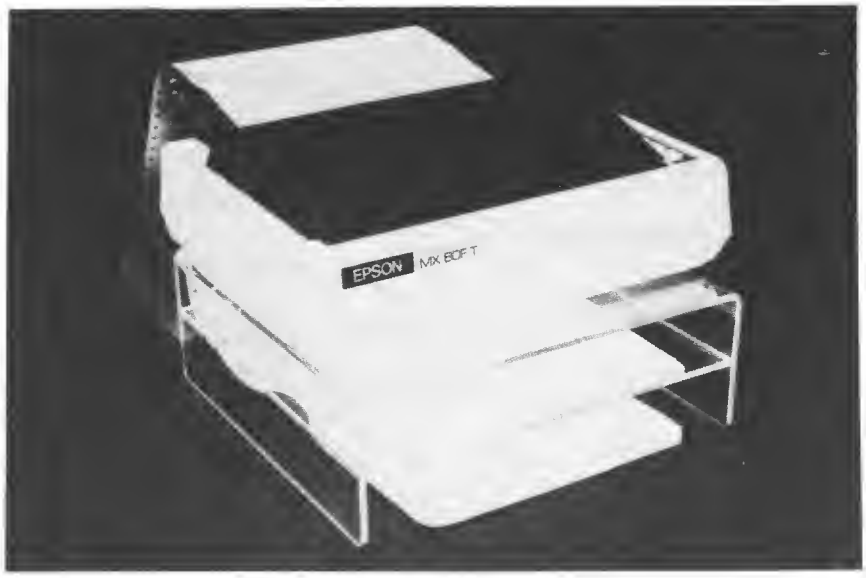

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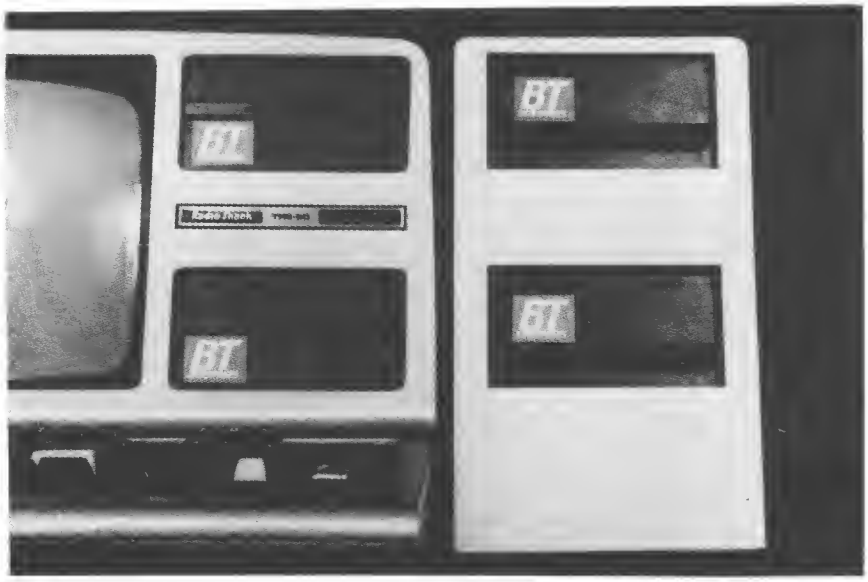

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This Model III Utility, written by Dick Balcom, allows you to load system tapes into your computer at either 500 or 1500 Baud and then copy them onto a new tape at either 500 or 1500 Baud. Includes 10 page instruction manual, **$9.95**

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CLINTEST

Bruce Wallace

This program was written for diabetics. The purpose of this software is to help diabetics achieve better control by providing their physicians with a hard-copy printout of their sugar levels on a weekly basis. Once the hard copy is produced, the user rotates the paper to a horizontal position and connects the asterisks by lines. This, in effect, produces a graph-like picture of the individual's sugar levels for the week.

When the user inputs data for a new week, the reference to the sugar level (negative=0, trace=.5, etc.) is displayed at the top of the video screen. For example, if on Monday A. M. the Clinitest result was negative, the user would enter a "0". If the sugar level at noon on Monday was trace, the user would enter ".5". Data entry is for the entire week, beginning on Monday and continuing through Sunday. Once all data have been entered, the program returns to the menu. The user may then save the data on disk.

Menu instructions are as follows:

1 - Enter New Data	Use this function to input new data for the week.
2 - Load File	Loads previously stored files into memory for examination or hard-copy printout.
3 - Print File	User may display file on the video display or have a hard-copy printout.
4 - Save Data	Saves the current file in memory on disk.
5 - End Program	Self-explanatory.

It is assumed that the person using this program does, in fact, monitor his or her sugar levels using the keto-diastik or clinitest method. These test strips are generaly available at a local drug store. The program makes no allowance for any acetone entries. (It may be modified to do so, however.)

This program has been written for my wife's benefit. It is dedicated to her!

Hardware requirements:

TRS-80 Model I or III with 32K RAM
Two disk drives (one drive can work)
Line Printer

This program was originally written in Disk Basic using the NEWDOS disk operating system. There are six separate programs in the entire package: MENU, CLINTEST, FOODLOG, CALCOUNT, MASTER, and PRINT.

MENU

```
100 CLS
200 'MENU PROGRAM TO RUN OTHER PROGRAMS
300 PRINT TAB(20)STRING$(15,"*")
400 PRINT TAB(20)"  M  E  N  U"
500 PRINT TAB(20)STRING$(15,"*")
600 PRINT : PRINT
700 PRINT TAB(10)"(S)TORE CALORIES ABOUT MEALS"
800 PRINT TAB(10)"(P)RINT WEEKLY SUMMARY OF MEALS"
900 PRINT TAB(10)"(E)NTER CLINITEST RESULTS"
1000 PRINT TAB(10)"(R)EAD CLINILOG MASTER FILE"
1005 PRINT TAB(10)"(O)UTPUT FOOD LOG FORMS FOR WEEK
1100 PRINT TAB(10)"(T)ERMINATE  PROGRAM"
1200 PRINT TAB(10)"ENTER SELECTION ";:PRINT CHR$(143)
1300 A$=INKEY$
1310 IF A$="S" THEN PRINT @ 730,"S": RUN"CALCOUNT"
1320 IF A$="P" THEN PRINT @ 730,"P": RUN"PRINT"
1330 IF A$="E" THEN PRINT @ 730,"E": RUN"CLINTEST"
1340 IF A$="R" THEN PRINT @ 730,"R": RUN"MASTER"
1350 IF A$="O" THEN PRINT @ 730,"O": RUN"FOODLOG"
1360 IF A$="T" THEN PRINT @ 730,"T": PRINT @ 842,"PROGRAM
TERMINATED": END
1365 IF A$="" THEN PRINT @ 730,CHR$(30): FOR X=1 TO 100:
NEXT : PRINT @ 730, CHR$(143)
1370 FOR X=1 TO 100: NEXT : GOTO 1300
1400 GOTO 1300
```

CLINTEST

```
100 ' PROGRAM WRITTEN BY : BRUCE WALLACE
300 ' PROGRAM  ID. - CLINTEST
500 '
700 ' ****************************
900 ' *    VARIABLE  LIST       *
1100 ' *  N$= NAME
1300 '*  CW$= CURRENT WEEK      *
1500 '
1700 '
1900 '
2100 '
2300 '
2500 CLEAR 1000: DIM M$(12)
2700 CLS
2900 DATA MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY,
SATURDAY, SUNDAY
3100 DATA A.M.,NOON,P.M.,BED
3300 FOR A=1 TO 7: READ DW$(A): NEXT : FOR B=1 TO 4:READ
TD$(B): NEXT
3500 DATA JANUARY, FEBRUARY, MARCH, APRIL, MAY, JUNE, JULY,
AUGUST, SEPTEMBER, OCTOBER, NOVEMBER, DECEMBER
3700 FOR M=1TO12:READ M$(M):NEXT
3900 CLS: PRINT @20,"C L I N I T E S T":
PRINT @74,STRING$(40,"-")
```

```
4100 PRINT @ 148,"ENTER YOUR NAME";:INPUTN$
4300 PRINT @ 212,"ENTER CURRENT WEEK AS MM/DD/YY";:INPUTCW$
4500 IF VAL(LEFT$(CW$,2))>12 THEN PRINT @ 276,"INPUT
ERROR...TRY AGAIN": FOR Z=1 TO 800: NEXT : PRINT @242,CHR$(31):
GOTO 4300
4700 IF MID$(CW$,3,1) <>"/" OR MID$(CW$,6,1)<>"/" THEN
PRINT @ 276,"INPUT ERROR...TRY AGAIN": FOR Z=1 TO 500 : NEXT :
PRINT @ 242,CHR$(31): GOTO 4300
4900 IF VAL(MID$(CW$,7,1))<8 THEN PRINT @ 276,"INPUT
ERROR...TRY AGAIN": FOR Z= 1 TO 500: NEXT :
PRINT @242,CHR$(31):GOTO4300
5100 PRINT @ 148,CHR$(31)
5300 PRINT @ 212,"ENTER NEW DATA--TYPE 1"
5500 PRINT @ 276,"LOAD FILE-------TYPE 2"
5700 PRINT @ 340,"PRINT FILE------TYPE 3"
5900 PRINT @ 404,"SAVE DATA-------TYPE 4"
6100 PRINT @ 468,"END PROGRAM-----TYPE 5"
6300 PRINT @ 532,"SELECTION";:INPUTS
6500 IF S<1 OR S>5 THEN PRINT @ 596,"INPUT ERROR...TRY AGAIN":
FOR Z=1 TO 500: NEXT : PRINT @541,CHR$(31): GOTO 6300
6700 ON S GOTO 6900,11300,16300,13900,40000
6900 '******** D A T A  E N T R Y **********
6905 AC=0
6910 IF CW$<>""THEN 6920ELSE7100
6920 CLS: PRINT @212,"ENTER NEW WEEK (MM/DD/YY)";: INPUT CW$
6930 IF VAL(LEFT$(CW$,2))>12 THEN PRINT @276,"INPUT ERROR...TRY
AGAIN": FOR Z=1 TO 800: NEXT:PRINT @ 242,CHR$(31):GOTO6920
6940 IF MID$(CW$,3,1)<>"/" OR MID$(CW$,6,1)<>"/" THEN PRINT
@ 276,"INPUT ERROR...TRY AGAIN": FOR Z= 1 TO 800:NEXT:PRINT @
 242,CHR$(31):GOTO6920
6950 IF VAL(MID$(CW$,7,1))<8 THEN PRINT @ 276,"INPUT
ERROR...TRY AGAIN": FOR Z=1 TO 800: NEXT : PRINT
@ 242,CHR$(31): GOTO 6920
7100 CLS: PRINT @7,"CLINITEST ENTRIES FOR ";N$:
PRINT @50,"0=NEG": PRINT @ 56,".5=TRACE":PRINT @ 75,"CURRENT
WEEK  ";CW$: PRINT @104,"1=1+": PRINT @110,"2=2+": PRINT @
115,"3=3+":PRINT @ 120,"4=4+":PRINT @ 138,"-->ACETONE"
7200 PRINT @153,"1=SMALL" :PRIN T@163,"2=MODERATE" :PRINT
@181,"3=LARGE"
7300 SA=0
7500 PRINT @ 202,STRING$(54,"-")
7700 FOR A=1TO7:SA=SA+1:AC=AC+1
7900   FOR B=1TO 4
8100     PRINT @ 266,"TEST RESULTS FOR ";DW$(A);" ";TD$(B);:
INPUT TR(B,A): PRINT @330,"ACETONE";: INPUT K(B,A): PRINT
@279,CHR$(31): IF TR(B,A)<0 DR TR(B,A)>4 OR K(B,A)<0 OR
K(B,A)>3 THEN 50000
8300     NEXT B
8310     PRINT @ 330,"COMMENTS ";:LINEINPUTCM$(A)
8320     PRINT @ 330,CHR$(31)
8500     PRINT @ 394,"DATA JUST ENTERED"
8700     PRINT @ 458,STRING$(20,"-")
8900     PRINT @ 522,DW$(A)
9100    H1=586: FOR Z=1TO4:PRINT @ H1,TD$(Z):H1=H1+10:NEXT:H1=0
9300 PRINT @ 704,"SUGAR":    N=714:FOR B=1TO4:PRINT
@ N,TR(B,A):N=N+10:NEXT:N=0
9310 PRINT @ 768,"KETONES":   N=778:FOR B=1TO4:PRINT
@ N,K(B,A):N=N+10:NEXT:N=0
9500     PRINT @ 906,"IS THIS CORRECT";: INPUT AN$:
IF LEFT$(AN$,1) ="N" THEN GOSUB 20100
9700     IF LEFT$(AN$,1)="Y" THEN 10100
9900     PRINT @ 842,"PLEASE TRY AGAIN":FOR X=1TO800:NEXT
10100     PRINT @ 295,CHR$(31)
10300 NEXTA
10500 ' ******* E N D  O F  D A T A  E N T R Y *******
10700 'RETURN TO MENU
10900 CLS: PRINT @20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-")
11100 GOTO5300
11300 ' *******  EXAMINE FILE  ******
11500 ' ** FIRST CHECK DATE **
11700 CLS:PRINT @ 138,"ENTER DATE <MM/DD/YY>";:INPUTCW$
11900 AC=0:SA=0:'ACCUMULATORS
12100 GOSUB20300
12300 PRINT @ 202,"SEARCHING FOR ";F$
12500 ON ERROR GOTO 21500
12700 OPEN"I",1,F$+":1"
12900 INPUT#1,N$
13100 INPUT#1,CW$
13300 FOR A=1TO7:AC=AC+1:SA=SA+1: FOR B=1TO4: INPUT#1,TR(B,A):
INPUT#1,K(B,A): NEXT: INPUT#1,CM$(A): NEXT
13500 CLOSE1:PRINT @ 266,"FILE LOADED"
13700 FOR X=1TO1000:NEXT:CLS:PRINT @ 20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-"):GOTO5300
13900 ' ** SAVE NEW DATA TO DISK **
14100 '** FIRST TEST TO SEE IF THERE IS NEW DATA TO BE SAVED **
14300 CLS: IF SA=0 THEN PRINT @212,"NEW DATA FILE EMPTY":
FOR X=1 TO 800: NEXT : CLS : PRINT @20,"C L I N I T E S T":
PRINT @ 74, STRING$(40,"-"): GOTO 5300
14500 GOSUB 20300:'ESTABLISH FILE NAME
14700 PRINT @ 212,"SAVING ";F$
14900 OPEN"O",1,F$+":1"
14910 OPEN"E",2,"MASREC/DAT:1":PRINT#2,CW$:CLOSE2
15100 PRINT#1,N$
15300 PRINT#1,CW$
15500 FOR A=1TO7: FOR B=1TO4: PRINT#1,TR(B,A): PRINT#1,K(B,A):
NEXTB: PRINT#1,CHR$(34);CM$(A);CHR$(34):NEXTA
15700 CLOSE1:PRINT @ 276,"FILE SAVED":FOR X=1TO800:NEXT
15900 CLS:PRINT @ 20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-")
16100 GOTO5300
16300 CLS:'PRINT GRAPH-- SUBROUTINE
16500 IF AC=0 THEN PRINT @ 212,"FILE NOT LOADED":
FOR X=1 TO 1000: NEXT : CLS: PRINT @ 20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-"): GOTO5300
16600 PRINT @212,"DO YOU WANT HARD-COPY (Y/N)";: INPUT AN$:
IF LEFT$(AN$,1)="Y" THEN 32000
16700 PRINT @ 0,"NAME: ";N$:PRINT @ 64,"CURRENT WEEK :";CW$
16900 FOR A=1TO7:PRINT @ 128,DW$(A):PRINT @ 192,STRING$(50,"-")
17100 PRINT @ 266,"NG": PRINT @ 271,"TR": PRINT @ 276,"1+":
PRINT @ 281,"2+": PRINT @ 286,"3+": PRINT @ 291,"4+":
PRINT @ 301,"KETONES"
17300 PRINT @ 320,STRING$(50,"-")
17500     PN=384:FOR B=1TO4:PRINT @ PN,TD$(B);
17700     IF TR(B,A)=0 THEN PRINT TAB(10)"NG"; ELSE PRINT
TAB(10)"";
17900     IF TR(B,A)=.5 THEN PRINT TAB(15)"TR"; ELSE PRINT
TAB(15)"";
```

```
18100      IF TR(B,A)=1 THEN PRINT TAB(20)"1+";
ELSE PRINT TAB(20)"";
18300      IF TR(B,A)=2 THEN PRINT TAB(25)"2+";
ELSE PRINT TAB(25)"";
18500      IF TR(B,A)=3 THEN PRINT TAB(30)"3+";
ELSE PRINT TAB(30)"";
18700      IF TR(B,A)=4 THEN PRINT TAB(35)"4+";
ELSE PRINT TAB(35)"";
18710      IF K(B,A)>0 THEN PRINT TAB(45)K(B,A)
ELSE PRINT TAB(45) ""
18900      PN=PN+64
19100      NEXT B
19300      PN=0
19310     IF CM$(A)="" THEN 19500 ELSE PRINT @ 714,"COMMENTS:
";CM$(A)
19500 PRINT @ 852,"PRESS <ENTER> TO CONTINUE";: LINE INPUT X$:
PRINT @ 128,CHR$(31)
19700 NEXT A
19710 ' PRINT OUT TO LINE PRINTER?
19720 PRINT @832,CHR$(31): PRINT @ 852,"HARD COPY (Y/N)";:
INPUT AN$
19730 IF LEFT$(AN$,1)="N" THEN 19900 ELSE 32000
19900 CLS: PRINT @ 20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-"): GOTO5300
20100 FOR B=1TO4:TR(B,A)=0: NEXT:A=A-1:RETURN:'ERROR ROUTINE
20300 'DATE SUBROUTINE FOR FILENAME STRUCTURE
20500 FOR M=1TO12
20700 IF VAL(LEFT$(CW$,2))=M
THEN F$=LEFT$(M$(M),3)+MID$(CW$,4,2)+"/Y"+RIGHT$(CW$,2) 20900
NEXT 21100 RETURN
21500 PRINT @ 266,"NO FILE FOUND":FOR X=1TO1000:NEXT:CLS:
PRINT @ 20,"C L I N I T E S T":PRINT @ 74,STRING$(40,"-"):
RESUME5300
30000 'LINE PRINTER HEADING SUBROUTINE:' *********
30100 LPRINT TAB(10)"NG";TAB(20)"TR";TAB(30)"1+"; TAB(40)"2+";
TAB(50)"3+"; TAB(59)"4+";: LPRINT STRING$(5," ");:
LPRINT "KETONES"
30200 LPRINT TAB(10)STRING$(70,"-")
30300 LPRINT" "
30400 RETURN:'*********
32000 'LINE PRINTER ROUTINE FOR CLINITEST
32100 'FIRST TEST TO SEE IF PRINTER ON
32200 CLS
32300 IF PEEK(14312)>127 THEN PRINT @212,"TURN PRINTER ON":
FOR X=1 TO 500: NEXT: PRINT @ 200,CHR$(31): FOR X=1 TO 300:
NEXT : GOTO 32300
32310 LPRINT" ":LPRINT" "
32400 LPRINT TAB(0)"CLINITEST RESULTS FOR : ";N$
32500 LPRINT TAB(0)"FOR WEEK OF: ";CW$
32600 LPRINT STRING$(80,"-")
32700 LPRINT" "
32800 GOSUB 30000
32900 FOR A=1 TO 7: LPRINT TAB(0)DW$(A): LPRINT
TAB(0)STRING$(10,"-")
33000   FOR B=1 TO 4: LPRINT TAB(0)TD$(B);
33100   IF TR(B,A)=0 THEN LPRINT TAB(10)"* NG"; ELSE LPRINT
TAB(10)"";
33200   IF TR(B,A)=.5 THEN LPRINT TAB(20)"* 1/10%"; ELSE LPRINT
TAB(20)"";
33300   IF TR(B,A)=1 THEN LPRINT TAB(30)"* 1/4%"; ELSE LPRINT
TAB(30)"";
33400   IF TR(B,A)=2 THEN LPRINT TAB(40)"* 1/2%"; ELSE LPRINT
TAB(40)"";
33500   IF TR(B,A)=3 THEN LPRINT TAB(50)"* 1%"; ELSE LPRINT
TAB(50)"";
33600   IF TR(B,A)=4 THEN LPRINT TAB(59)"* 2%"; ELSE LPRINT
TAB(59)"";
33605    LPRINT TAB(63)STRING$(5," ");
33610   IF K(B,A)=0 THEN LPRINT"--"; ELSE LPRINT"";
33620   IF K(B,A)=1 THEN LPRINT"LIGHT"; ELSE LPRINT"";
33630   IF K(B,A)=2 THEN LPRINT"MODERATE"; ELSE LPRINT"";
33640   IF K(B,A)=3 THEN LPRINT"HEAVY" ELSE LPRINT""
33700    LPRINT" "
33800   NEXT B
33810  IF CM$(A)=""THEN 33820 ELSE LPRINT"COMMENTS : ";:
LPRINTCM$(A)
```


5,000,000/20,000,000 BYTES

From Micro Mainframe

10 MEGABYTE HARD DISK DRIVES, with REMOVABLE Cartridges, For Models I / II / III ($5,995/$8990).

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GL/M1 and AR/M1 require proof of purchase of the original programs, or, send a disk copy of the original programs for conversion at no additional charge. Documentation (apply to purchase) — $5.00 each.

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NEWDOS/80 - $135 LDOS - $135 EPSON MX-70/80/FT - $Call FRICTION KIT - $49

AT-80 3827 Dismount Dallas, Texas 75211 (214) 339-0498

```
33820 LPRINT" "
33850 IF A=4 LPRINT CHR$(11)
33900 NEXT A
33910 LPRINT" "
34000 LPRINT "THE PRECEDING REPRESENTS THE SUGAR LEVELS DF ";N$
34100 LPRINT "FDR THE WEEK OF ";CW$
34200 LPRINT " ": LPRINT "END OF REPORT"
34300 FOR Z=1 TO 2: LPRINT CHR$(11): NEXT
34400 CLS: PRINT @ 20,"C L I N I T E S T":
PRINT @ 74,STRING$(40,"-")
34500 GDTO 5300
40000 PRINT @ 852,"THANKS FDR USING ME"
40100 FOR Z=1 TO 2000: NEXT : CLS
40200 PRINT @ 212,CHR$(23)" B Y E "
40300 FOR X=1 TO 1000: NEXT : CLS : RUN "MENU"
50000 ' ERROR SUBRDUTINE
50010 'INSERT CLEAR CHR$( ) HERE
50020 PRINT @ 877,"INPUT ERROR": PRINT @ 941,"TRY AGAIN": FOR
X=1TO 800: NEXT: PRINT @876,CHR$(31): PRINT @295,CHR$(30):
GOTO 8100
```

FOODLOG

```
10"100 CLEAR 200: CLS
300 PRINT @ 20,"F 0 0 D   L 0 G"
500 PRINT STRING$(60,"*")
700 PRINT TAB(10)"THIS PROGRAM REPRODUCES ON THE LINE
PRINT ER A"
900 PRINT TAB(10)"DATA INPUT FORM USED TO COLLECT DATA FOR
LATER"
1100 PRINT TAB(10)"INPUT INTO THE SYSTEM USING THE PROGRAM
CALLED" 1300 PRINT TAB(10)"CALORIE COUNTER."
1500 FOR Z=1 TO 2000: NEXT : PRINT @ 128,CHR$(31)
1502 PRINT TAB(10)"YOU HAVE THE OPTIDN OF PRINT ING ALL
THE FORMS"
1504 PRINT TAB(10)"OR JUST A FEW AT A TIME.
 PLEASE SPECIFY THE "
1506 PRINT TAB(10)"NUMBER FROM 1 TO 7";:INPUT N
1900 DATA BREAKFAST, MID-MORN SNAK, LUNCH, AFTERNOON SNAK,
SUPPER, BEDTIME SNAK
2100 FOR A=1 TO 6: READ Z$(A): NEXT
2300 C=6
2500 DATA MONDAY, TUESDAY, WEDNESDAY, THURSDAY, FRIDAY,
SATURDAY, SUNDAY
2700 FDR D=1 TO 7: READ DW$(D): NEXT
2900 PRINT : PRINT
3100 PRINT TAB(10)"ENTER MONDAY'S DATE";:INPUT CW$
3105 C$=CW$
3300 CLS
3500 GOSUB 8100:'TEST TO SEE IF PRINT ER IS DN
3700 PRINT @ 212,"PRINT ING WILL NOW PROCEED": FOR X=1 TO
1000: NEXT
3900 FOR D=1 TO N
4100 LPRINT TAB(20)"F  0  0  D     L  D  G"
4300 LPRINT " ": LPRINT TAB(20)"WEEK OF : ";CW$: LPRINT " "
4500 LPRINT TAB(27)DW$(D)
4700 CLS
4900 A=1
```


CONVERT YOUR SERIAL PRINTER TO PARALLEL

NEW MODEL UPI-3 SERIAL PRINTER INTERFACE MAKES IT POSSIBLE TO CONNECT AN ASCII SERIAL PRINTER TO THE PARALLEL PRINTER PORT ON THE TRS-80.

Software compatibility problems are totally eliminated because the TRS-80 "THINKS" that it has a parallel printer attached. NO MACHINE LANGUAGE DRIVER NEEDS TO BE LOADED INTO HIGH MEMORY BECAUSE THE DRIVER ROUTINE FOR THE UPI-3 IS ALREADY IN THE TRS80 ROM! SCRIPSIT, PENCIL, RSM 2, ST80D, NEWDOS, FORTRAN, BASIC etc. all work as if a parallel printer was in use.

The UPI-3 is completely self contained and ready to use. A 34 conductor edge card connector plugs onto the parallel printer port of the model I Expansion Interface or onto the parallel printer port on the TRS-80 III. A DB25 socket mates with the cable from your serial printer. The UPI-3 converts the parallel output of the TRS-80 printer port into serial data in both the RS232-C and 20 MA. loop formats.

SPEEDWAY ELECTRONICS
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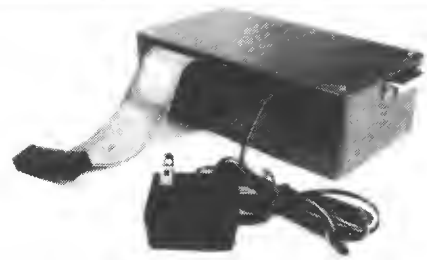

Switch selectable options include:
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- 7 or 8 Data Bits per word
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- Parity or No parity
- ODD or EVEN Parity

NOW AVAILABLE FOR MODEL II

UPI-2 for TRS80 Model II	$149.95
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Specify BAUD rate 50-9600 BAUD	

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3) Definable break (yes/no)
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5) Commands:
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   b) Turn off RTS,
   c) Receive data only from terminal,
   d) Receive data only from host,
   e) Send data only to host,
   f) Send data only to terminal,
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   h) Operate in ST80™ mode,
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This is a self relocating subroutine that can load anywhere in high memory.

Communications hardware available

SMALL BUSINESS
SYSTEMS GROUP, INC.
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Westford, MA 01886
(617) 692-3800

```
5100 FOR I=1 TO 3
5300 LPRINT TAB(8)Z$(A);TAB(52)Z$(A+1)
5500 LPRINT  TAB(4)STRING$(18,"*");TAB(49)STRING$(18,"*")
5700    LPRINT " "
5900 LPRINT  TAB(10)"FOOD";TAB(35)"SERV";TAB(45)"FOOD";:
LPRINT  TAB(62)STRING$(18," ");: LPRINT  "SERV"
6100 LPRINT " "
6300   FOR J=1 TO 6
6500     LPRINT  TAB(3)STRING$(30,"-");
TAB(35)STRING$(3,"-"); TAB(45)STRING$(30,"-");: LPRINT
STRING$(5," "); TAB(5)STRING$(3,"-")
6700   LPRINT " ": NEXT J
6900 LPRINT " "
7100 A=A+2
7300 NEXT I
7500 LPRINT CHR$(11)
7700 NEXT D
7900 RUN "MENU
8100 '**** TEST TO SEE IF LINE PRINT ER ON ******************
8300 PRINT @256,CHR$(31)
8500 IF PEEK(14312)>127 THEN PRINT @270,">> TURN PRINT ER ON
<<":FOR Z= 1 TO 500: NEXT : PRINT  @256,CHR$(30):
FOR Z=1 TO 250: NEXT : GOTO 8500
8700 RETURN
8900 '*********************************************
```

CALCOUNT

```
100 'PROGRAM ID.  CALCOUNT
200 CLS
300 PRINT @ 212,"C A L O R I E   C O U N T E R":
FOR X=1 TO 1000: NEXT
400 PRINT @ 212,"7  S E C O N D S   P L E A S E"
500 CLEAR 1000
600 DEFINT I
700 'THERE ARE 6 CATEGORIES OF FOOD
800 'MILK  VEGETABLES  FRUIT  BREAD  MEAT  FAT
900 '
1000 'VARIABLES
1100 ' ************************************************
1200 ' BK$=BREAKFAST MM$=MID-MORNING SNAK   LU$=LUNCH
1300 ' AF$=AFTERNOON SNAK  SU$=SUPPER   BT$=BEDTIME
1400 ' AC= ACCUMULATOR FOR USE INSIDE A LOOP
1500 'S1=MORNING SERVING  S2=MID-MORN SERVING
1600 'S3=LUNCH SERVING  S4=AFTERNOON SNAK SERVING
1700 'S5=SUPPER SERVING    S6=  BEDTIME SERVING
1800 'B=SUBSCRIPT ACCUMULATOR
1900 'TC= TOTAL CALORIES  GT= GRAND TOTAL CALORIES
2000 'BK=ACCUMULATOR FOR BREAKFAST
2100 'MM=ACCUMULATOR FOR MID-MORNING SNAK
2200 'LU=LUNCH ACCUMULATOR
2300 '************************************************
2400 DIMFD$(200),S(200),TC(200),I$(200),C(200),M$(12)
2500 '************************************************
2600 'FOOD DATA STATEMENTS
2700 DATA MILK,170,EGGS,75,TEA,20,COKE,100
2800 DATA ASPARAGUS,25,BEAN SPROUTS,25,BEETS,25
2900 DATA BROCCOLI,25,BRUSSEL SPROUTS,25,CABBAGE,25
3000 DATA CARROTS,25,CAULIFLOWER,25,CELERY,25
```

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```
3100 DATA MUSHROOMS,25,ONIONS,25
3200 DATA SAUERKRAUT,25,STRING BEANS,25,GREEN BEANS,25
3300 DATA TOMATOES,25,SALAD,25
3400 DATA TOMATO JUICE,25,VEGETABLE JUICE,25
3500 DATA APPLE,40,APPLE JUICE,40,APPLESAUCE,40
3600 DATA BANANA,40,BLACKBERRIES,40
3700 DATA BLUEBERRIES,40,RASPBERRIES,40,STRAWBERRIES,40
3800 DATA CHERRIES,40,CIDER,40
3900 DATA GRAPEFRUIT,40,GRAPES,40,GRAPE JUICE,40
4000 DATA CANTELOUPE,40,HONEYDEW,40
4100 DATA WATERMELON,40,NECTARINE,40,ORANGE,40
4200 DATA ORANGE JUICE,40,PEACH,40,FRUIT JUICE,40
4300 DATA PEAR,40,PINEAPPLE,40
4400 DATA PINEAPPLE JUICE,40,PLUMS,40
4500 DATA TANGERINE,40
4600 DATA BREAD,70,STUFFING,70
4700 DATA ENGLISH MUFFIN,70,PLAIN ROLL,70
4800 DATA FRANKFURTER ROLL,70,HAMBURGER BUN,70
4900 DATA DRIED BREAD CRUMBS,70,TORTILLA,70
5000 DATA BRAN FLAKES,70,PUFFED CEREAL,70
5100 DATA COOKED CEREAL,70,GRITS,70,RICE,70
5200 DATA PASTA,70,SPAGHETTI,70,MACARONI,70,LASAGNA,240
5300 DATA POPCORN,70,FLOUR,70,POTATO CHIPS,160
5400 DATA WHEAT GERM,70,GRAHAM CRACKERS,70,RITZ CRACKERS,70
5410 DATA CRACKERS,70
5500 DATA PRETZELS,70,SALTINES,70,PANCAKES,115,WHEAT THINS,70
5600 DATA BEANS,70,PEAS,70,LENTILS,70,CORN,70,CORN ON COB,70
5700 DATA LIMA BEANS,70,POTATO,70,MASHED POTATO,70,SQUASH,70
5800 DATA SWEET POTATO,70
5900 DATA BEEF,55,LAMB,55,PORK,55,VEAL,55,POULTRY,55,
CHICKEN,55 6000 DATA FISH,55,CHEESE,55,COTTAGE
CHEESE,55,TURKEY,55 6100 DATA
MARGARINE,45,CORN OIL,45,OLIVES,45,BUTTER,45 6200 DATA
PEANUTS,45,BACON,45,CREAM CHEESE,45,SALAD DRESSING,45 6300
DATA MAYONAISE,45 6400 DATA HAM,75,DRIED
BEANS,125,HAMBURGER,100,COLD CUTS,100 6410 DATA MEATLOAF,100
6500 DATA HOTDOG,100,RIBS,100,ROAST,100,RIB STEAK,100
6600 DATA CLUB STEAK,100,RIBEYE STEAK,75,SIRLOIN STEAK,55
6700 DATA CHEDDAR CHEESE,100,MOZZARELLA CHEESE,75
6800 DATA ICE CREAM,160
6900 DATA VEGETABLE SOUP,100
7000 DATA XX,99
7100 '***** END OF FOOD DATA *****
7200 '***** DATA FOR TIME OF MEAL ****
7300 DATA BREAKFAST,MID-MORNING SNACK,LUNCH,AFTERNOON SNACK
7400 DATA SUPPER,BED-TIME SNACK
7500 '*********************************
7600 '*** READ INTO MEMORY IN ARRAY FORM THE FOOD DATA ***
7700 FOR I=1 TO 200
7800 PRINT @ 340,"READING DATA ITEM >";SA;"<"
7900  READ I$(I),C(I)
8000  IF I$(I)="XX" THEN 8300
8100 SA=SA+1
8200 NEXT
8300 ' ***** NOW READ DAYS OF WEEK INTO AN ARRAY ******
8400 FOR Z=1 TO 6: READ M$(Z): NEXT
8500 '**** READ IN TO MEMORY (ARRAY) TIME OF MEAL *****
8600 ' ******* START OF MAJOR LOOP  ******
```

```
8700 FOR Z=1 TO 6
8800 GOSUB 11300
8900 NEXT Z
9000 ' NOW STORE DAYS FOOD RESULTS ON DISK
9100 CLS : PRINT TAB(20)"STORE DATA ON DISK":
FOR X=1 TO 500: NEXT
9200 '****************************************
9300 CLS : PRINT : PRINT TAB(10)"ENTER CURRENT MONDAY DATE
 AS"
9400 PRINT TAB(10)"---> MM/DD/YY ";: INPUT CW$: GOSUB 19100
9500 PRINT : PRINT TAB(10)"ENTER DAY OF WEEK";: INPUT D$
9600 CLS : PRINT @ 212,">> STORING DATA <<"
9700 OPEN"E",1,F$
9800 PRINT #1,D$
9900 PRINT #1,BK,MM,LU,AS,SU,NT
10000 'ADD UP TOTAL OF ARRAYS
10100 'EF=END OF FILE
10200 FOR A=1 TO BK: PRINT #1,BK$(A);",";BS(A);",";BC(A):
NEXT
10300 FOR A=1 TO MM: PRINT #1,MM$(A);",";MS(A);",";MC(A):
NEXT
10400 FOR A=1 TO LU: PRINT #1,LU$(A);",";LS(A);",";LC(A):
NEXT
10500 FOR A=1 TO AS: PRINT #1,AS$(A);",";AS(A);",";AC(A):
NEXT
10600 FOR A=1 TO SU: PRINT #1,SU$(A);",";SS(A);",";SC(A):
NEXT
10700 FOR A=1 TO NT: PRINT #1,BT$(A);",";NS(A);",";NC(A):
NEXT
10800 CLOSE 1
10900 CLS : PRINT @ 212,"THANK YOU": FOR X=1 TO 500: NEXT
11000 PRINT @ 212,"HAVE A NICE DAY!!!": FOR X=1 TO 1000: NEXT
11100 CLS
11200 RUN"MENU"
11300 ' SUBROUTINE
11400 CLS
11500 PRINT TAB(10),">>>>>> ";M$(Z);" SUMMARY <<<<<<"
11600 PRINT TAB(10)STRING$(45,45)
11700 PRINT TAB(10)"ENTER FOOD DESCRIPTION";:INPUTFD$
11800 'CHECK TO SEE IF FOOD ON LIST
11900 FOR A=1 TO SA
12000   IF FD$=I$(A) THEN 12400
12100 NEXT A
12200 PRINT TAB(10)"NOT ON LIST, TRY AGAIN!!"
12300 FOR X=1 TO 800: NEXT : PRINT @ 128,CHR$(31): GOTO 11700
12400 PRINT TAB(10)"ENTER # OF SERVINGS";: INPUT S
12500 M=M+1:CO=CO+1
12600 'CALCULATE CALORIES
12700 TC=S * C(A):'TOTAL CALORIES = SERVING X VALUE OF FOOD
12800 IF Z=1 THEN GOSUB 14700
12900 IF Z=2 THEN GOSUB 14900
13000 IF Z=3 THEN GOSUB 15200
13100 IF Z=4 THEN GOSUB 15500
13200 IF Z=5 THEN GOSUB 15800
13300 IF Z=6 THEN GOSUB 16100
13400 PRINT TAB(10)"ANY MORE ENTRIES";:INPUTAN$
13500 IF LEFT$(AN$,1)="Y" THEN PRINT @ 128,CHR$(31): GOTO
11700
13600 'ZERO OUT MAIN COUNTERS
13700 M=0
13800  'PRINT OUT SUMMARY
13900 PRINT TAB(10)"FOOD";TAB(25)"SERVING";TAB(35)"CALORIC
VALUE"
14000 IF Z=1 THEN GOSUB 16500
14100 IF Z=2 THEN GOSUB 16900
14200 IF Z=3 THEN GOSUB 17300
14300 IF Z=4 THEN GOSUB 17700
14400 IF Z=5 THEN GOSUB 18100
14500 IF Z=6 THEN GOSUB 18500
14600 RETURN
14700 BK$(M)=FD$:BS(M)=S:BC(M)=TC:BK=BK+1: RETURN
14800 'BK$=BREAKFAST  BS=BREAKFAST SERV  BC= BREAKFAST
CALORIES
14900 MM$(M)=FD$:MS(M)=S:MC(M)=TC:MM=MM+1: RETURN
15000 'MM$= MID-MORNING  MS=MID-MORN SERV   MC=MID-MORN
CALORIES
15100 MM=COUNTER FOR ARRAY
15200 LU$(M)=FD$:LS(M)=S:LC(M)=TC:LU=LU+1: RETURN
15300 'LU$= LUNCH  LS=LUNCH SERVINGS   LC=LUNCH CALORIES
15400 ' LU= COUNTER FOR LUNCH
15500 AS$(M)=FD$:AS(M)=S:AC(M)=TC:AS=AS+1: RETURN
15600 'AS$=AFTERNOON SNAK  AS=AFTERNOON SERVINGS
AC=AFTERNOON CALORIES
15700 'AS=COUNTER FOR AFTERNOON SNAK
15800 SU$(M)=FD$:SS(M)=S:SC(M)=TC:SU=SU+1: RETURN
15900 'SU$=SUPPER  SS=SUPPER SERVINGS  SC=SUPPER CALORIES
16000 'SU=COUNTER FOR SUPPER
16100 BT$(M)=FD$:NS(M)=S:NC(M)=TC:NT=NT+1: RETURN
16200 'BT$=BEDTIME FOOD  BS=BEDTIME SERVINGS
BC=BEDTIME CALORIES
16300 'NT=BEDTIME COUNTER
16400 '*******  SUBROUTINES FOR PRINTING  MEALS ******
16500 FOR A=1 TO BK: PRINT TAB(10)BK$(A);TAB(26)BS(A);
TAB(37)BC(A):TN=TN+BC(A): NEXT
16600 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
16700 PRINT TAB(36)TN: PRINT TAB(10)"PRESS <ENTER> TO
CONTINUE";: INPUT Q
16800 RETURN
16900 FOR A=1 TO MM: PRINT TAB(10)MM$(A);TAB(26)MS(A);
TAB(37)MC(A):MT=MT+MC(A): NEXT
17000 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
17100 PRINT TAB(36)MT: PRINT TAB(10)"PRESS <ENTER>
TO CONTINUE";: INPUT Q
17200 RETURN
17300 FOR A=1 TO LU: PRINT TAB(10)LU$(A);TAB(26)LS(A);
TAB(37)LC(A):LT=LT+LC(A): NEXT A
17400 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
17500 PRINT TAB(36)LT:PRINT TAB(10)"PRESS <ENTER> TO
CONTINUE";: INPUT Q
17600 RETURN
17700 FOR A=1 TO AS: PRINT TAB(10)AS$(A);TAB(26)AS(A);
TAB(37)AC(A):AT=AT+AC(A): NEXT A
17800 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
17900 PRINT TAB(36)AT:PRINT TAB(10)"PRESS <ENTER> TO
CONTINUE";: INPUT Q
18000 RETURN
18100 FOR A=1 TO SU: PRINT TAB(10)SU$(A);TAB(26)SS(A);
TAB(37)SC(A):ST=ST+SC(A): NEXT A
```

```
18200 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
18300 PRINT TAB(36)ST:PRINT TAB(10)"PRESS <ENTER> TO
CONTINUE";: INPUT Q
18400 RETURN
18500 FDR A=1 TO NT: PRINT TAB(10)BT$(A);TAB(26)NS(A);
TAB(37)NC(A):N1=N1+NC(A): NEXT A
18600 GOSUB 19000: PRINT TAB(10)"TOTAL CALORIES";
18700 PRINT TAB(36)N1: PRINT TAB(10)"PRESS <ENTER> TO
CONTINUE";: INPUT Q
18800 RETURN
18900 ' ****************************************************
19000 PRINT TAB(10)STRING$(40,45): RETURN
19100 'ROUTINE TO CREATE FILE NAME FROM NUMERIC WEEK ENTRY
19200 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY
19300 DATA AUGUST,SEPTEMBER,OCTOBER,NOVEMBER,DECEMBER
19400 FOR M=1 TO 12: READ M$(M): NEXT
19500 FOR M=1 TO 12: IF VAL(LEFT$(CW$,2))=M THEN
F$=LEFT$(M$(M),3)+ MID$(CW$,4,2)+"/Y"+RIGHT$(CW$,2)+".MEALS'
19600 NEXT
19700 RETURN
```

MASTER

```
25 CLS : PRINT TAB(20)STRING$(20,"=")
26 PRINT TAB(20)"CLINILOG MASTER FILE"
27 PRINT TAB(20)STRING$(20,"=")
50 PRINT @ 212,"DIRECTIONS (Y/N)";: INPUT AN$
55 IF LEFT$(AN$,1)="Y" THEN GOSUB 10000
100 ' PROGRAM WRITTEN BY BRUCE WALLACE
200 ' MASTER FILE
300 ' PROGRAM ID. MASTER
400 '
500 '
600 '
700 '
800 CLS : CLEAR 1000
900 DIM CW$(52)
1000 'THIS PROGRAM LOOKS AT THE MASTER FILE CREATED BY
1100 'CLINTEST AND PRINTS THE RECORDS (IE. WEEKS) THAT
1200 'ARE STORED
1250 ON ERROR GOTO 20000
1300 OPEN"I",1,"MASREC/DAT:1"
1400 I=0:N=0
1500 IF EOF(1) THEN 1530
1510 I=I+1:N=N+1: INPUT #1,CW$(I)
1520 GOTO 1500
1530 CLOSE 1: PRINT @ 212,"THERE ARE ";I;"FILES"
1535 PRINT @ 276,"STORED ON THIS DISKETTE":FOR X=1 TO 1900: NEXT
1540 TB=10
1550 AC=0
1700 PRINT @ 21,"C L I N T E S T": PRINT @ 87,"M A S T E R":
PRINT @ 153,"F I L E"
1710 PRINT @ 213,STRING$(15,"-")
1720 PRINT @ 272,"C U R R E N T  F I L E S"
1730 PRINT
1800 FOR I=1 TO N
1900 PRINT TAB(TB)CW$(I);:TB=TB+30
1910 IF TB>40 THEN PRINT:TB=10
1920 FOR X=1 TO 80: NEXT
```


G GR GRBASIC

GRAPHICS ENHANCEMENT PACKAGE FOR THE TRS-80 MODEL I AND MODEL III

The TRS-80's Level II BASIC contains no easy to use, fast commands for handling graphics. GRBASIC 3.0 fills this void by adding a set of commands to Level II BASIC that allow line drawing, shape handling, circle generation, and sound generation. Corner to corner lines are drawn in less than 8/100 of a second!

FEATURES OF GRBASIC

LDRAW: Draws or erases lines between sets of coordinates. Coordinates may be chained.

SDRAW..USING...: Draws or erases the designated shape at the designated coordinates, including extended space.

CIRCLE: Draws a circle around a designated center with a designated radius, including drawing in extended space.

TURN: Rotates a shape in 45 degree increments.

SIZE: Sets the scaling factor for shape drawing.

AUDIO: Sends modulated sound to speaker.

All existing Level II programs are upward compatible with GRBASIC 3.0. No existing BASIC commands are altered, and all GRBASIC commands are tokenized. GRBASIC includes versions of GRBASIC for 16K, 32K, and 48K machines, SEDIT, a shape editor program, and MISSILE, a real-time arcade game written entirely in GRBASIC. The manual has been rewritten for clarity and contains more examples.

GRBASIC 3.0 Cassette and Manual $19.95

GRBASIC 3.0 Diskette and Manual $24.95

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```
1930 AC=AC+1
1940 IF AC=10 THEN AC=0: PRINT @ 845,"PRESS <ENTER> TO CONT..";:
LINE INPUT X$: PRINT @ 320,CHR$(31)
2000 NEXT
2100 PRINT @ 845,"HARD COPY (Y/N)";: INPUT AN$
2200 IF LEFT$(AN$,1)="Y"THEN 2300 ELSE 3500
2300 GOSUB 22000: CLS : PRINT @ 212,"PRINTING WILL NOW PROCEED":
FOR X=1 TO 1000: NEXT:AC=0:TB=0:
LPRINT TAB(15)"C L I N I T E S T"
2400 LPRINT TAB(15)"   M A S T E R "
2500 LPRINT TAB(15)"      F I L E  "
2600 LPRINT" "
2700 LPRINT TAB(10)STRING$(30,"-")
2800 TB=10:AC=0
2900 FOR A=1 TO N
3000 LPRINT TAB(10)CW$(A)
3200 AC=AC+1:IF AC>16 THEN LPRINTCHR$(11): FOR X=1 TO 4:
LPRINT" ": NEXT
3300 NEXT A
3400 LPRINT CHR$(11)
3500 RUN"MENU
10000 'DIRECTIONS
10100 CLS : PRINT : PRINT TAB(10)"THIS PROGRAM WILL
ACCESS THE DATA"
10200 PRINT TAB(10)"DISKETTE AND LOOK FOR A FILE CALLED
MASREC/DAT"
10300 PRINT TAB(10)"WHICH CONTAINS DATA FILES RELATING TO
CLINTEST."
10400 PRINT
10500 PRINT TAB(10)"IF NO FILE IS FOUND THE COMPUTER WILL
RESPOND"
10600 PRINT TAB(10)"WITH ";: PRINT CHR$(34);: PRINT"NO FILE
FOUND";: PRINT CHR$(34);: PRINT"."
10700 PRINT : PRINT TAB(10)"ARE YOU READY TO BEGIN";: INPUT AN$
10800 IF LEFT$(AN$,1)="Y" THEN RETURN ELSE 10100
20000 CLS : PRINT @ 212,"NO FILE FOUND": RESUME 21000
21000 FOR X=1 TO 1000: NEXT : RUN"MENU"
22000 '**** TEST TO SEE IF LINE PRINTER ON *****
22010 PRINT @ 256,CHR$(31)
22020 IF PEEK(14312)>127 THEN PRINT @ 270,">> TURN PRINTER
ON <<": FOR Z= 1 TO 500 : NEXT : PRINT @ 256,CHR$(30):
FOR Z=1 TO 250: NEXT : GOTO 22020
22030 RETURN
22040 '*********************************************
```

PRINT

```
100 CLEAR 1000: CLS
200 DIM M$(12)
210 PRINT TAB(20)"P R I N T"
220 PRINT TAB(10)STRING$(40,45)
300 PRINT TAB(10)"THIS PROGRAM INPUTS DATA STORED ON DISK"
310 PRINT TAB(10)STRING$(40,45)
400 PRINT TAB(10)"AND THEN PRINTS OUT A HARD-COPY OF THE"
500 PRINT TAB(10)"FOOD, SERVINGS AND CALORIES FOR EACH "
600 PRINT TAB(10)"MEAL."
700 PRINT
710 FOR X=1 TO 2500: NEXT
720 PRINT @ 256,CHR$(31): PRINT TAB(10)"WHEN THE PROGRAM ASKS
FOR THE"
730 PRINT TAB(10)"NUMERIC WEEK, PLEASE ENTER THE MONDAY"
740 PRINT TAB(10)"DATE IN THE FORMAT (MM/DD/YY)."
750 PRINT : PRINT
800 PRINT TAB(10)"ENTER THE NUMERIC"
810 PRINT TAB(10)"WEEK AS MM/DD/YY)";: INPUT CW$
900 GOSUB 2700
901 PRINT TAB(10)"SUMMARY PRINT-OUT ONLY";: INPUT AN$
902 IF LEFT$(AN$,1)="Y" THEN CLS:GOSUB8000:GOTO2530
920 PRINT TAB(10)"ENTER # OF DAYS";: INPUT N:'THIS CAN BE TAKEN
OUT WHEN THE REST OF PROGRAM IS FINISHED
1000 '*********** FILE INPUT **************
1100 PRINT @ 256,CHR$(31):: PRINT @ 266,">> SEARCHING FOR
";LEFT$(F$,5);+",19";+MID$(F$,8,2);" <<"
1200 ON ERROR GOTO 3400
1300 OPEN"I",1,F$
1310 FOR Z=1 TO N:'7 WILL BE SUBSTITUTED FOR N LATER
1312 INPUT #1,D$
1315 INPUT #1,BK,MM,LU,AS,SU,NT
1700 FOR A=1 TO BK: INPUT #1,BK$(A),BS(A),BC(A): NEXT
1800 FOR A=1 TO MM: INPUT #1,MM$(A),MS(A),MC(A): NEXT
1900 FOR A=1 TO LU: INPUT #1,LU$(A),LS(A),LC(A): NEXT
2000 FOR A=1 TO AS: INPUT #1,AS$(A),AS(A),AC(A): NEXT
2100 FOR A=1 TO SU: INPUT #1,SU$(A),SS(A),SC(A): NEXT
2200 FOR A=1 TO NT: INPUT #1,BT$(A),NS(A),NC(A): NEXT
2320 PRINT @ 256,CHR$(31): PRINT @ 266,">> ";D$;"'S DATA READ
<<":FOR X=1 TO 1000: NEXT
2325 GOSUB 6000:'TEST TO SEE IF PRINTER IS ON
2330 GOSUB 5000:'NOW GO AND PRINT
2340 NEXT Z
2400 CLOSE 1
2530 LPRINT CHR$(11)
2600 RUN"MENU"
2700 ' ****** FILE NAME CREATION ********
2710 '***** USES PASSWORD "MEALS" *****
2800 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY
2900 DATA AUGUST,SEPTEMBER,OCTOBER,NOVEMBER,DECEMBER
3000 FOR M=1 TO 12: READ M$(M): NEXT
3100 FOR M=1 TO 12: IF VAL(LEFT$(CW$,2))=M THEN
F$=LEFT$(M$(M),3)+ MID$(CW$,4,2)+"/Y"+RIGHT$(CW$,2)+".MEALS"
3200 NEXT : RESTORE
3300 RETURN
3350 '******* ERROR TRAPPING ******
3400 PRINT @ 256,CHR$(31): PRINT @ 266,">> NO FILE FOUND <<":
FOR X=1 TO 1000: NEXT
3500 RUN"MENU"
3600 RESTORE : CLS : GOTO 210
3610 '*****************************************************
5000 '************ PRINTER ROUTINE FOR EACH DAY **********
5005 CLS : PRINT @ 212,"PRINTING WILL NOW PROCEED": FOR LP=1 TO
1000: NEXT LP: CLS
5010 LPRINT TAB(20)CW$
5020 LPRINT TAB(20)STRING$(15,"-")
5030 LPRINT" ": LPRINT TAB(22)D$;"'S FOOD INTAKE"
5040 LPRINT STRING$(50,"*")
5050 LPRINT TAB(10)"FOOD";TAB(25)"SERVINGS";TAB(40)"CALORIES
5060 LPRINT " "
5062 LPRINT TAB(15)"BREAKFAST": LPRINT " "
```

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```
5070 FOR A=1 TO BK
5080 IF BC(A)>99 THEN LPRINT TAB(10)BK$(A); TAB(27)BS(A);
TAB(41) BC(A) ELSE LPRINT TAB(10)BK$(A); TAB(27)BS(A);
TAB(42)BC(A)
5090   TC=TC+BC(A)
5100 NEXT A
5105 GT=GT+TC
5110 LPRINT TAB(41)"----"
5115 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5130 TC=0
5140 LPRINT" "
5145 LPRINT TAB(15)"MID-MORNING SNACK": LPRINT " "
5150 FOR A=1 TO MM
5160 IF MC(A)>99 THEN LPRINT TAB(10)MM$(A); TAB(27)MS(A);
TAB(41) MC(A) ELSE LPRINT TAB(10)MM$(A); TAB(27)MS(A);
TAB(42)MC(A)
5170   TC=TC+MC(A)
5180 NEXT A
5181 GT=GT+TC
5185 LPRINT TAB(41)"----"
5190 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5200 TC=0: FOR X=1 TO 2: LPRINT" ": NEXT
5205 LPRINT TAB(15)"LUNCH": LPRINT" "
5210 FOR A=1 TO LU
5220 IF LC(A)>99 THEN LPRINT TAB(10)LU$(A); TAB(27)LS(A);
TAB(41)LC(A) ELSE LPRINT TAB(10)LU$(A); TAB(27)LS(A);
TAB(42)LC(A)
5230   TC=TC+LC(A)
5240 NEXT A
5241 LPRINT TAB(41)"----"
5242 GT=GT+TC
5250 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5260 TC=0: LPRINT " "
5265 LPRINT TAB(15)"AFTERNOON SNACK": LPRINT " "
5270 FOR A=1 TO AS
5280 IF AC(A)>99 THEN LPRINT TAB(10)AS$(A); TAB(27)AS(A);
TAB(41)AC(A) ELSE LPRINT TAB(10)AS$(A); TAB(27)AS(A);
TAB(42)AC(A)
5290   TC=TC+AC(A)
5300 NEXT A
5301 GT=GT+TC
5305 LPRINT TAB(41)"----"
5310 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5320 TC=0: LPRINT " "
5325 LPRINT TAB(15)"SUPPER": LPRINT " "
5330 FOR A=1 TO SU
5340 IF SC(A)>99 THEN LPRINT TAB(10)SU$(A); TAB(27)SS(A);
TAB(41)SC(A) ELSE LPRINT TAB(10)SU$(A); TAB(27)SS(A);
TAB(42)SC(A)
5350   TC=TC+SC(A)
5360 NEXT A
5361 LPRINT TAB(41)"----"
5362 GT=GT+TC
5370 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5380 TC=0: LPRINT " "
5385 LPRINT TAB(15)"BEDTIME SNACK": LPRINT " "
5390 FOR A=1 TO NT
5400 IFNC(A)>99 THEN LPRINT TAB(10)BT$(A); TAB(27)NS(A);
TAB(41)NC(A) ELSE LPRINT TAB(10)BT$(A); TAB(27)NS(A);
TAB(42)NC(A)
5410   TC=TC+NC(A)
5420 NEXT A
5421 LPRINT TAB(41)"----"
5422 GT=GT+TC
5430 IF TC>99 THEN LPRINT TAB(10)"TOTAL CALORIES";TAB(41)TC
ELSE LPRINT TAB(10)"TOTAL CALORIES";TAB(42)TC
5440 TC=0: LPRINT " "
5450 LPRINT TAB(7)"GRAND TOTAL CALORIES FOR ";D$;" =";TAB(37)GT
5455 T=T+GT:GT=0
5460 LPRINT CHR$(11)
5470 RETURN
6000 '**** TEST TO SEE IF LINE PRINTER ON *****
6005 PRINT @ 256,CHR$(31)
6010 IF PEEK(14312)>127 THEN PRINT @ 270,">> TURN PRINTER ON
<<":FOR Z=1 TO 500: NEXT : PRINT @ 256,CHR$(30):
FOR Z=1 TO 250: NEXT : GOTO 6010
6020 RETURN
6030 '*********************************************
8000 '************ SUMMARY  FILE INPUT #***************
8020 PRINT @ 256,CHR$(31): PRINT @ 266,">> SEARCHING FOR
";LEFT$(F$,5);+",19";+MID$(F$,8,2);" <<"
8040 ON ERROR GOTO 3400
8060 OPEN"I",1,F$
8080 FOR Z=1 TO 7
8100 INPUT #1,D$
8120 INPUT #1,BK,MM,LU,AS,SU,NT
8140 FOR A=1 TO BK: INPUT #1,BK$(A),BS(A),BC(A):BT=BT+BC(A):
NEXT
8160 FOR A=1 TO MM: INPUT #1,MM$(A),MS(A),MC(A):MT=MT+MC(A):
NEXT
8180 FOR A=1 TO LU: INPUT #1,LU$(A),LS(A),LC(A):LT=LT+LC(A):
NEXT
8200 FOR A=1 TO AS: INPUT #1,AS$(A),AS(A),AC(A):AT=AT+AC(A):
NEXT
8220 FOR A=1 TO SU: INPUT #1,SU$(A),SS(A),SC(A):ST=ST+SC(A):
NEXT
8240 FOR A=1 TO NT: INPUT #1,BT$(A),NS(A),NC(A):TN=TN+NC(A):
NEXT
8260 'ACCUMULATE TOTAL CALORIES FOR EACH DAY
8280 GT(Z)=BT+MT+LT+AT+ST+TN:'GT(Z) REPRESENTS GRAND TOTAL
CALORIES FOR EACH DAY (Z)
8300 'NOW ZERO OUT ACCUMULATORS
8320 BT=0:MT=0:LT=0:AT=0:ST=0:TN=0
8330 Z$(Z)=D$
8340 NEXT Z
9000 GOSUB 6000
9010 PRINT @ 212,"PRINTING WILL NOW PROCEED": FOR X=1 TO 1000:
NEXT
9020 'NOW PRINT THE SUMMARY INFORMATION
9030 LPRINT TAB(20)"S U M M A R Y   F O R"
9040 LPRINT TAB(20)"   W E E K    O F"
```

continued on page 51

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PROGRAM CONVERSION (PART II)

Richard Kaplan

This month I will deal with the most fundamental topic in program conversion—the actual program transfer. Entering in 300K of programming into a computer is not a pleasing thought, but when a microcomputer owner upgrades to a MODEL II or to a MODEL III, this is frequently the situation he is confronted with. Fortunately, there is an alternative—DIRECT TRANSFER.

Transferring a BASIC program (the only type of data transfer which is within the scope of this article) can generally be accomplished through one of two methods: transmit the program over an RS-232 interface, or convert the program disk to the new computer's format. Whenever possible, disk conversion is preferable.

TRANSFERRING TO THE MODEL I FROM THE MODEL II

A program which must be sent from the MODEL II to the MODEL I can only be transferred through an RS-232 board for your MODEL I. This board fits into your expansion interface and will allow outside communication. If you do purchase this board, it is advisable to purchase a special clamp (available for $5.95 from many computer stores) to hold this board in place. Without the clamp, you will spend hours getting your RS-232 to work.

Next you will need a smart terminal program for your MODEL I. A smart terminal program (such as "Smart Terminal" by Howe Software) can be purchased through many software vendors, including Computronics. Since there are many such programs on the market, it would be beyond the scope of this article to describe the actual operation of such a program. The program's documentation should be of assistance here.

The most important element in getting your RS-232 setup to function properly is the actual hookup between the two computers. This can be done by means of a modem or a special cable.

A modem is a device used to communicate between two computers, usually by telephone, which usually are miles apart. If you do not have access to both computers together, a modem is an unnecessary waste of money. You can construct a cable which will do the same function for a fraction of the cost.

If you have both computers in the same room, you can construct what is a modified DB-25 cable. First, you will need a standard RS-232 cable to connect to your RS-232 board. You should also purchase a DB-25 extension cable.

Your DB-25 extension cable should be modified for use without a modem. To do this, you must open up the cable and remove all connections. The final cable which you solder should have the following connections:

SIDE A	SIDE B
1	1
2	3
3	2
4	5
5	4
6,20	8
8	6,20
7	7

What you must do is connect each pin listed under side A with the appropriate pin on side B. In the case of "6,20", this means that pins 6 and 20 should be soldered together on the SAME SIDE, and then a wire from either of these should connect to pin 8 on the other side.

Once you have decided upon and set up either two modems (one for each computer) or a direct-connect cable, you must plug in the appropriate cables. Hook your RS-232 cable into your expansion interface, and connect either your MODEL I modem or one end of your direct-connect cable to it. Hook either your MODEL II modem or the other end of your direct-connect cable into PORT B on your MODEL II. (Port B is the lower of the two "serial" ports. It can be found on the reverse side of your computer towards the bottom.)

Type the following on your MODEL II (once you have booted up):

```
SETCOM B=(600,8,N,2) <ENTER>

FORMS S <ENTER>

FORMS X <ENTER>
```

The SETCOM statement initializes your computer to send your program over the cable. FORMS S tells the computer that whenever you issue an LPRINT or LLIST statement, the program should go through the cable, not to your printer. FORMS X cancels an automatic line feed after every 132 characters, as is done when a printer is used.

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Run your MODEL I terminal program now and initialize it for 600 baud, 8 bit words, no parity, and 2 stop bits. Then enter receive mode (consult your documentation).

To transmit a program, load it from BASIC on the MODEL II. Then simply type LLIST, and VOILA! You have been spared endless hours of unnecessary retyping.

TRANSFERRING TO THE MODEL I FROM THE MODEL III

A program which must be sent from the MODEL III to the MODEL I can be sent over an RS-232 interface, or the disks can be converted with a special operating system. *[Editor's note: you can also CSAVE the program on a cassette at 500 baud and CLOAD it on the Model I.]*

If you choose to use an RS-232 interface, follow the same instructions as under "FROM MODEL II" with regard to modems and/or a cable. The setup instructions are identical, except that the modem or cable should plug into your RS-232 interface on the bottom of your MODEL III. (This is an option—check to see if you have it.)

Transmitting from the MODEL III requires the ROUTE command, which is not available on TRSDOS 1.3 (or on a cassette-based system). If you do not have TRSDOS 1.2, you can use a MODEL III smart terminal program. If you do have 1.2, follow this procedure on your MODEL III:

```
SETCOM (BAUD=600,WORD=8,STOP=2,PARITY
=3,WAIT) <ENTER>

ROUTE (SOURCE=PR, DESTIN=RO)  <ENTER>
```

The first command initializes your RS-232 interface for 600 baud, 8-bit words, 2 stop bits, and no parity. The second command diverts any subsequent printer output to the RS-232 interface.

Once your setup is complete, simply follow the same directions as under "FROM MODEL II". With regard to your MODEL I terminal program, type LLIST (once your program has been loaded) and your program will be transferred.

OR

You may transfer your programs by converting your disks if you purchase the DOSPLUS operating system for both the MODEL I and the MODEL III. If you do so, the procedure is:

Insert your MODEL III TRSDOS disk into drive 1 of your MODEL III.

Insert a DOSPLUS operating system into drive 0 and type CONVERT : 1 :0.

When DOS PLUS appears, insert a blank diskette into drive 1 and FORMAT it. However, be sure to format it under SINGLE DENSITY and with 35 TRACKS. Type TRANSFER:0 :1 and all programs from drive 0 will be transferred to drive I.

The disk in drive 1 is now readable by a MODEL I. Simply place MODEL I DOSPLUS into drive 0 and your converted disk into drive 1. If you try to get a directory you will see that the disk is MODEL I readable.

TRANSFERRING TO THE MODEL II FROM THE MODEL I

Transferring from the MODEL I to the MODEL II requires the same hardware setup as from the II to the I, except that port A on the MODEL II must be used. Once this set up has been established, simply do the following:

SETCOM A=(600,8,N,2) <ENTER>

TERMINAL <ENTER>

Run your MODEL I terminal program now and initialize it for 600 baud, 8-bit words, no parity, and 2 stop bits. Then enter the transmit mode (consult your documentation).

Enter terminal mode on your MODEL II. (There is an option for this on the MODEL II terminal menu.) Then enter terminal mode on your MODEL I and transmit your program from your MODEL I.

TRANSFERRING TO THE MODEL II FROM THE MODEL III

To transfer from the III to the II, you will need a modem or cable, as described previously under II to I. Once this setup has been established, do the following:

On your MODEL III, type:

SETCOM (BAUD=600,WORD=8,STOP=2,PARITY =3,WAIT)

ROUTE (SOURCE=PR, DESTIN=RO)

The first command initializes your RS-232 interface for 600 baud, 8-bit words, 2 stop bits, and no parity. The second command diverts any subsequent printer output to the RS-232 interface.

On your MODEL II, type:

SETCOM A=(600,8,N,2) <ENTER>

TERMINAL <ENTER>

Now enter the terminal mode on your MODEL II. Load your BASIC program on the MODEL III. Type LLIST, and the program will be transferred.

TRANSFERRING TO THE MODEL III FROM THE MODEL II

To transfer from the II to the III, you will again need either a modem or a cable. Once this has been set up, the procedure is:

On your MODEL III:

Inititalize your smart terminal program for 600 baud, 8-bit words, 2 stop-bits, and no parity. Then enter RECEIVE mode.

On your MODEL II:

SETCOM B=(600,8,N,2) <ENTER>

FORMS S <ENTER>

FORMS X <ENTER>

Now, go into BASIC on your MODEL II and load your program. Type LLIST and your program will be transferred.

TRANSFERRING TO THE MODEL III FROM THE MODEL I

Transferring a program from the MODEL I to the MODEL III is perhaps the easiest of all. MODEL III TRSDOS has a built-in routine to do this. The procedure is:

Insert your MODEL I disk into drive I and a TRSDOS disk into drive 0.

Type CONVERT.

The source diskette is drive 1 and the destination is drive 0.

When the disks stop, the disk in drive 0 is a MODEL III readable version of the disk in drive I.

This concludes this month's tips on program conversion. If you have any comments or suggestions, or if there is a specific topic which you would like to see covered, let me know. All correspondence is welcomed. Simply write to Richard Kaplan, c/o H & E Computronics.

continued from page 31

Minicomputers are based on a 16 bit value, and can operate on 32 bit values.

Mainframe computers are based on a 32 bit value, and can operate on 64 bit values.

Different combinations of bits have specific names associated with them. The table below presents several

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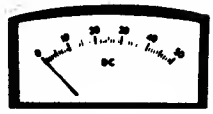

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common names and the maximum numbers that can be represented by them.

2 bits = 1 Dybit	3
4 bits = 1 Nybble	16
8 bits = 1 Byte	255
16 bits = 1 Halfword	65535
32 bits = 1 Word	4,294,967,295
64 bits = 1 Doubleword:	18,446,744,073,709,551,615

Minicomputer manufactures call 16 bit values a Word, and 32 bit values a Doubleword (you didn't expect it to be simple, now did you?). Some minicomputers might include the DEC PDP-11, or the Hewlet Packard 3000. Mainframes might include the IBM 370/168, or the CDC Cyber. Of course, there are many other manufacteres of computers, and the differences between them only add to the general confusion.

In the next issue, we will investigate negative numbers, base 16 numbers, and logical operations. I bet you can't wait!

Joseph Rosenman
35-91 161st Street, Apt. 4J
Flushing, NY 11358 ■

continued from page 46

```
9050 LPRINT TAB(24)CW$
9060 LPRINT TAB(20)STRING$(21,"=")
9070 LPRINT " "
9072 LPRINT TAB(24)"RUTH WALLACE": LPRINT " "
9074 LPRINT TAB(12)"DAY";TAB(37)"CALORIES": LPRINT " "
9080 FOR Z=1 TO 7
9090 LPRINT TAB(10)Z$(Z);TAB(20)"TOTAL CALORIES =";
TAB(40)USING"####"; GT(Z)
9100 LPRINT " "
9110 GT=GT+GT(Z)
9120 NEXT Z
9125 LPRINT TAB(10)STRING$(45,"="): LPRINT " "
9130 LPRINT TAB(10)"GRAND TOTAL CALORIES =";
TAB(39)USING"##,###"; GT
9135 GT=0:'ZERO OUT COUNTER
9140 LPRINT CHR$(11):'PAGE EJECT
9150 RETURN
9160 '*****************************************************
```


Bruce Wallace
2364 Anna Avenue
Clearwater, FL 33515 ■

PRACTICAL BUSINESS PROGRAMS

S. M. Zimmerman, Ph.D. and L. M. Conrad

Depreciation under the Economic Recovery Tax Act of 1981

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The depreciation law is new. We do not pretend to understand the depreciation law completly at this point in time. We wrote the program using the table lookup values as per the new law. Where, when, or how the depreciation schedules should be used is a question you must ask your accountant.

The schedules included in the program are the most current available. They seem to apply to all assets except real property. For real property the Treasury Department has yet to issue a table for cost recovery which is to approximate 175% declining balance depreciation (200% for some low-income housing). Until this material is published a program cannot be written.

Our program uses DATA statements to define the value of the depreciation rates. We will point out where the different values are saved so you can make your own adjustment just in case the law is changed again.

The tables which are included in our program are:

For property placed in service in 1981 - 1984

Recovery year	3 year	5 year	10 year	public utility 15 years
1	25	15	8	5
2	38	22	14	10
3	37	21	12	9
4		21	10	8
5		21	10	7
6			10	7
7			9	6
8			9	6
9			9	6
10			9	6
11				6
12				6
13				6
14				6
15				6

For property placed in service in 1985

Recovery year	3 year	5 year	10 year	public utility 15 years
1	29	18	9	6
2	47	33	19	12
3	24	25	16	12
4		16	14	11
5		8	12	10
6			10	9
7			8	8
8			6	7
9			4	6
10			2	5
11				4
12				4
13				3
14				2
15				1

For property placed in service after 1985

Recovery year	3 year	5 year	10 year	public utility 15 years
1	33	20	10	7
2	45	32	18	12
3	22	24	16	12
4		16	14	11
5		8	12	10
6			10	9
7			8	8
8			6	7
9			4	6
10			2	5
11				4
12				3
13				3
14				2
15				1

RUNNING THE PROGRAM

The program is very simple to run. The program starts by printing out the following credits and question:

```
1981 DEPRECIATION RULES

STEVEN M. ZIMMERMAN,PH.D. &

LEO M. CONRAD

HARD COPY (Y/N) ?
```

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The output may be obtained on the screen or on a printer. It makes little sense to copy things such as depreciation schedules off the screen unless you are only doing the task a few times and cannot afford a printer. We answered Y to the above question to obtain the sample printout which accompanies this article.

The next question is relative to the first cost of the asset. This value should include all costs which must be depreciated:

FIRST COST ?

For the sample run we used the value of $100 or 100. This resulted in a depreciation expense which agreed with the values obtained from the tables and made the task of checking our input data a little easier.

The next question in a depreciation program is usually the salvage. The new law allows the depreciation of assets to zero salvage. This eliminates one of the uncertainties in the application of the depreciation law, and does make things easier.

The next question is relative to the year the asset is put in service.

YEAR (19XX) ?

YOU MUST ANSWER THIS QUESTION WITH THE COMPLETE YEAR. 1985 was used in our sample run. If you do not use the complete year the computer will not know which table to use!

There are only four alternative lives allowed for an asset as indicated by the following question:

LIFE OF ASSET

3 5 10 15

?

When using the tables it is possible to select only one of the four lives noted above. Which assets fit which lives is a decision you and your accountant must make. For our example we selected 15 as the life to use.

The computer responded with the following:

YEAR DEPRECIATION BOOK VALUE
TITLE,DATE,OPERATOR ?

Since we had specified a hard copy the computer now had to ask us for identification information to put on the computer run. If we had not requested hard copy the computer would not have asked the question.

After we answer the question the computer will continue using both the screen and the printer and produce the sample run.

When we produce 15 years of output on a 16 line screen followed by an INPUT we lose the headings. Since this happens in this one case only, no adjustment was made to page the information on the screen.

```
1Ø CLEAR 4ØØ: DIM A(15): CLS : PRINT CHR$(23):
PRINT "1981 DEPRECIATION RULES": GOTO 6Ø: REM   "DEP81"
2Ø CLS : PRINT "YEAR              DEPRECIATION
                BOOK VALUE"
25 IF P$="Y" THEN INPUT "TITLE, DATE, OPERATOR";T$,D$,O$:
LPRINT "": LPRINT T$: LPRINT D$: LPRINT O$: LPRINT " ":
LPRINT "COST:$";FC: LPRINT
"YEAR                    DEPRECIATION           BOOK VALUE"
3Ø Z$="####         ###,###,###,###.##
  ###,###,###,###,###.##": RETURN
4Ø X=.Ø1*A(I)*FC: Y=X+Y: PRINT USING Z$;YR;X;FC-Y:
IF P$="Y" THEN LPRINT USING Z$;YR;X;FC-Y
5Ø RETURN
6Ø PRINT "STEVEN M. ZIMMERMAN,Ph.D. &":
PRINT"   LEO M. CONRAD": PRINT
7Ø INPUT "HARD COPY (Y/N)";P$
8Ø PRINT : INPUT "FIRST COST ";FC
9Ø INPUT "YEAR (19XX) ";YR: IF YR<1981 THEN 9Ø
1ØØ PRINT "LIFE OF ASSET": PRINT" 3   5   1Ø   15 "
11Ø INPUT L
12Ø IF L=3 THEN 17Ø
13Ø IF L=5 THEN 17Ø
14Ø IF L=1Ø THEN 17Ø
15Ø IF L=15 THEN 17Ø
16Ø GOTO 1ØØ
17Ø GOSUB 2Ø: IF YR=>1985 THEN FOR I= 1 TO 33: READ V: NEXT I:
IF YR>1985 THEN FOR I= 1 TO 33: READ V: NEXT I
18Ø FOR I= 1 TO 3: READ A(I): NEXT : IF L>3 THEN 21Ø
19Ø RESTORE : Y=Ø: FOR I=1 TO L: GOSUB 4Ø: YR=YR+1
2ØØ NEXT I: INPUT "ENTER TO CONTINUE";D$: GOTO 1Ø
21Ø FOR I=1 TO 5: READ A(I): NEXT : IF L>5 THEN 23Ø
22Ø GOTO 19Ø
23Ø FOR I=1 TO 1Ø: READ A(I): NEXT : IF L>11 THEN 25Ø
24Ø GOTO 19Ø
25Ø FOR I=1 TO 15: READ A(I): NEXT : GOTO 19Ø
26Ø DATA 25,38,37:REM  1981
27Ø DATA 15,22,21,21,21:REM  1981
28Ø DATA 8,14,12,1Ø,1Ø,1Ø,9,9,9,9:REM  1981
29Ø DATA 5,1Ø,9,8,7,7,6,2,6,6,6,6,6,6:REM  1981
1985 DATA 29,47,24:REM  1985
1986 DATA 18,33,25,16,8:REM  1985
1987 DATA9,19,16,14,12,1Ø,8,6,4,2:REM 1985
1988 DATA 6,12,12,11,1Ø,9,8,7,6,5,4,4,3,2,1:REM  1985
2ØØØ DATA 33,45,22:REM  1986+
2Ø1Ø DATA 2Ø,32,24,16,8:REM  1986+
2Ø2Ø DATA 1Ø,18,16,14,12,1Ø,8,6,4,2:REM  1986+
2Ø3Ø DATA 7,12,12,11,1Ø,9,8,7,6,5,4,3,3,2,1:REM  1986+
```

CORRECTION

An error was printed in the Amortization of Loans program in the January 1982 issue, in the Practical Business Programs column. The "greater than" sign in line 100 should have been printed as an **up arrow.** The correct line should read as follows:

```
100 R#=APR#/PP%: II#=(1.0000000+R#)↑(PP%*YEAR):
FF#=(R#*II#)/(II#-1): PAY#=FF#*LO#
```

We regret any inconvenience caused by this error.

EXAMINING THE PROGRAM

Lines 10 plus 60 through 160 are the program's title and menu for the selection of alternatives. Most alternatives have some type of error trapping which returns the user to the original question if an acceptable answer is not given. For example, if you try to depreciate an item for 4 years you will end up back on line 100, the original question, when lines 120 through 150 fail to route you to another part of the program.

Lines 20 through 50 are two subroutines which do most of the calculations and printing. The reason for placing the subroutines at the beginning of the program was to increase the speed of operation.

Lines 170 through 250 are the core of the program. This is where the data is read in and the information is organized for proper processing.

In lines 260 through 290 is the data for 1981 through 1984. If the government makes any changes in the depreciation methods for these years this is where the corrections must be made. Note:Line 260 is for three years, line 270 is for five years, line 280 is for ten years, and line 290 is for 15 years. Lines 1985 through 1988 is the data for 1985. It is organized in a manner similar to the earlier set.

Lines 2000 through 2030 handle data for the years after 1985. The organization here is consistent with other data.

SUMMARY

Our program is designed to handle the new depreciation schedules. Its application is a matter for you and your accountant to determine.

The program is organized for ease of correction if the government should change its mind on specific depreciation rates. As now designed, the program will select the proper schedule depending upon the year the asset is placed in service and depreciation starts.

For those of you who would like to be able to rewrite our program slightly for the yet-to-be-issued approximation to declining balance deprection, we have kept the programs simple to allow some changes. We hope to be able to follow up with the corrections ourselves if the publishing schedule can be arranged in this column.

Steven M. Zimmerman, Ph.D.
College of Business
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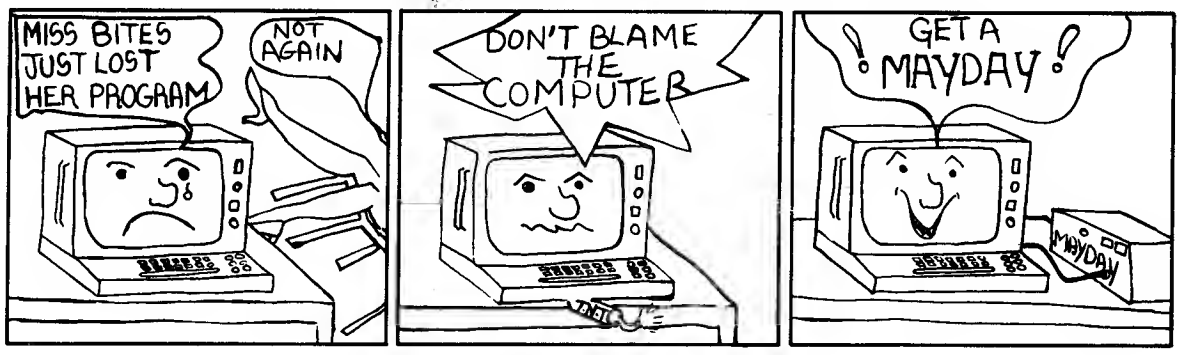

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continued from page 20

commands told to the computer. Also, for most children, the light pen is like magic. (That's because they don't realize how much time was put in to program this gadget to do that.) And, if a child is so intrigued with this piece of magic, they forget they are learning words or math (or whatever) while they are "playing" with this strange little pen.

There are several makes of the light pen available. Two that I can mention right off hand is the PHOTOPOINT light pen available through Micro Matrix, P. O. Box 938, Pacifica, CA 94044, and the 3G from 3G Company, Gaston, Oregon. Check the ads in the magazines for others.

Now, how else can we communicate with a computer? Have you ever suffered a Syntax error when you were tired and frustrated and actually resorted to YELLING at your computer? Don't you wish it could have understood you? Wouldn't it be nifty to just be able to talk to the computer and it would obey? Well, speech recognition is a new frontier in the world of computers. Many of the computer manufacturers are working on this in their reasearch and development labs.

The potential for helping a handicapped person using speech recognition is great. There have been developed, although not totally perfected, wheelchairs that are activated and controlled by one or two word commands that when spoken by the operator are acted upon by the computer. There are even voice activated telephone dialers, page turners, and control boxes for turning on electrical appliances.

Now just what does this have to do with our trusty TRS-80's. Well, for the Model I, there is a peripheral made by Tandy called the VOXBOX that is a speech recognition device. (To my knowledge, there is not a Model III version available as yet.)

Tandy notes in the girst pages of the VOXBOX manual that speech recognition is a new technology. It is so new, in fact, that the VOXBOX is one of the first devices for speech recognition to be readily available to the general public. It is therefore suggested that you use the VOXBOX for entertainment and experimentation. But should you want to apply the unit to a serious application, remember that you have been warned.

The VOXBOX connects directly to the TRS-80 keyboard at the port for the expansion interface, or it can be connected to the expansion interface. The package includes a microphone with a push-to-talk switch for talking to your computer.

Also, included with the package is the machine-language "driver" program. The machine-language program is the part that translates human speech

continued on page 64

COLOR COMPUTER CORNER

Joseph Rosenman

This month, we will examine the case of the missing integer. As you Model 1 and 3 users know (and as you non-Model 1 and 3 users might just as well know), the Models 1 and 3 have four data types: Integer, Single Precision, Double Precision, and String. The range of numbers that can be stored in an Integer variable is -32768 to +32767. Any larger (or smaller) number will cause an overflow error. The next data type is the Single Precision Real variable. This variable will store a number with up to six digits of accuracy. Any fractional portion in excess of the maximum six digits will be rounded off, and any number greater than the maximum size will cause the number to be stored in "scientific notation" form. Double Precision Real permits the use of up to 16 digits before rounding off or scientific representation. Of course, the String variable type is entirely different. This discussion will focus on the differences between number representations on the Models 1 and 3 and the Color Computer. String representation is roughly the same. String functions will be examined at a later date.

The Color Computer has only two variable types, Real and String. The only way to access Integer values is through the INT function. The commands: DEFINT, DEFSNG, DEFDBL, and DEFSTR are *unavailable* on the Color Computer. Any program being converted into Color Computer BASIC will need to remove these statements. Why are Double precision and Integer variable types used at all? Double precision can hold larger numbers, with a greater degree of accuracy. This accuracy is especially evident when you require fractional portions with many digits (i.e., more then 8). Integers are used because they are faster to work with and because they use less computer memory. In addition, Integers are frequently used in testing whether a number is odd or even. This (classic) test is a useful routine, so I will explain its operation with the numbers 7 and 8.

IF X/2 = INT(X/2) THEN "Number is Even" ELSE "Number is Odd"

Of course 7/2=3.5, and the Integer of 3.5 is 3: they don't compare. Therefore, the number is odd. 8/2=4, and the Integer of 4 is also 4: they do compare, so the number is even. When this test is being used in the logic of the program, you can use the INT function (in the same way it was used in the example above). The variable type known as REAL on the Color Computer is actually somewhere between the Single and Double Precision of the Models 1 and 3. On the Color Computer, a variable can represent a number with an accuracy of 9 digits (compared to 6 in Single Precision on the Models 1 and 3). The next step is to compare the numerical functions available in Model 1 and 3 BASIC and Color Computer Basic.

Function	Model 1/3	Color Computer
1) ABS	Y	Y
2) ATN	Y	Y
3) CDBL	Y	N
4) CINT	Y	N
5) COS	Y	Y
6) CSNG	Y	N
7) EXP	Y	Y
8) FIX	Y	Y
9) INT	Y	Y
10) LOG	Y	Y
11) RND	Y	Y
12) SGN	Y	Y
13) SIN	Y	Y
14) SQR	Y	Y
15) TAN	Y	Y

The results? CINT, CDBL, and CSNG are missing from the Color Computer. All of these functions operate with Double Precision numbers. CINT converts a Double Precision value into an Integer, CSNG converts an Integer or Double Precision number into a Single Precision number, and CDBL converts an Integer or Single Precision number into a Double Precision number. Since all of these functions involve Double Precision, a number type not implemented on the Color Computer, they are not included in the Color Computer.

It is important to note that the Color Computer is not intended for "scientific" computing. It is easy to convert a program that uses both Double and Single Precision number types into Single Precision. The *reason* that numbers were stored with Double Precision, however, will not be so easily changed. I suspect that if an application requires a number with the accuracy of Double Precision, then the Color Computer is not a suitable system for that application. In other words, a Model 2 or 3 would be more suitable than the Color Computer if you want the computer to control the position of a telescope in a large observatory, for example. Of course, if you are interested in games, graphics, general business and finance applications (such as maintaining a home budget, balancing your checkbook, or organizing your securities), then the Color Computer will be quite capable.

What about the string functions? The string variable type is the same in Models 1 and 3 BASIC and Color

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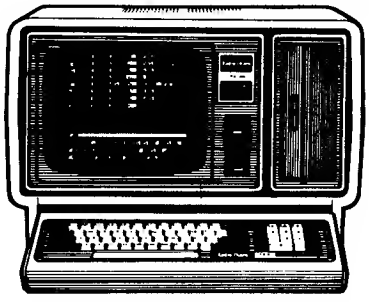

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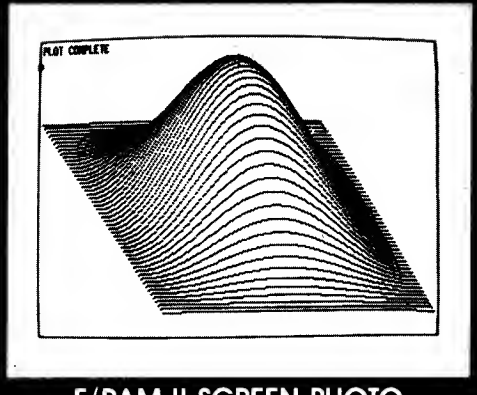

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Computer BASIC. The list of functions includes:

Function	Model 1/3	Color Computer
1) ASC	Y	Y
2) CHR$	Y	Y
3) FRE	Y	N
4) HEX$	N	Y
5) INKEY$	Y	Y
6) LEFT$	Y	Y
7) LEN	Y	Y
8) MID$	Y	Y
9) RIGHT$	Y	Y
10) STRING$	Y	Y
11) STR$	Y	Y
12) VAL	Y	Y

Here we see the only differences are with the functions FRE and HEX$. FRE is a function that examines the amount of STRING space remaining (unassigned). As most readers probably know, a certain amount of String memory is reserved with the CLEAR statement. As String variables are allocated, memory in the String area is assigned. FRE will display how much memory is still free. The Color Computer lacks a FRE function. I believe that the FRE function is usually used during program development, rather then during normal program execution. The HEX$ function converts a number from Decimal into Hexadecimal. This function does not exist on the Models 1 and 3 ! It is a special new function of the Color Computer.

There are other functions used in the two BASICs, and a quick comparison of them will show the additional areas of incompatability.

Function	Model 1/3	Color Computer
1) EOF	N	Y
2) ERL	Y	N
3) ERR	Y	N
4) INP	Y	N
5) JOYSTK	N	Y
6) MEM	Y	Y
7) OUT	Y	N
8) PEEK	Y	Y
9) POINT	Y	Y
10) POKE	Y	Y
11) POS	Y	Y
12) PPOINT	N	Y
13) USR	Y	Y
14) VARPTR	Y	Y

Here we see that there are several differences. To begin with, let's examine the Model 1 and 3 functions not implemented on the Color Computer. ERL and ERR are special functions used in "Error Trapping Routines". Usually, they are used in conjunction with the "ON ERROR GOTO" command. Often, the programmer can anticipate certain errors that can occur. In those cases, it might be possible for the program to take some corrective action. The option, of course, is to stop running the program and return to BASIC command level. The Color Computer can't perform Error Trapping. The only option available to the programmer is to have the program stop execution when an error condition is encountered.

The next missing function is INP. This function Inputs a number from an I/O Port. Along with this function is OUT. OUT will Output a number to an I/O Port. What would these functions be used to do? On the Models 1 and 3, you will often see OUT used to generate sound through the cassette port. The Color Computer has its own method of sound generation, with special commands in the Color Computer BASIC (such as SOUND and PLAY). I/O can also be used for connecting and controlling special external devices (remember the telescope? It would be "controlled" by an I/O Port. By the way, "I/O" stands for "Input/Output".) Any program that makes use of I/O instructions will require major changes in order to work on a different computer. If the program uses OUT in order to generate sound, you might simply remove the statements or substitute Color Computer BASIC commands.

Now it's time for Color Computer Revenge. We have several functions that are missing from the set contained on the Models 1 and 3, namely: EOF, JOYSTK, and PPOINT. EOF checks to see whether you have reached the end of a file. It returns a zero if the file is not completed, or a -1 if it is completed. JOYSTK reads the current position of the joysticks (there are no joysticks on the Models 1 and 3). There are four values that must be read to determine the Joystick positions: Horizontal left, Vertical left, Horizontal right, and Vertical right. PPOINT tests whether a graphics "cell" (something that was SET or RESet) is on or not, just like POINT. The difference is that PPOINT also returns the code of the Color at the target cell.

To summarize the above discussion: in order to convert a program from the Model 1 or 3 to the Color Computer, it is necessary to convert Integer, Single Precision, and Double Precision variable types to a single "Real" variable type. Most String and numerical functions are the same between the different microcomputers; the incompatible functions must be replaced. PEEKs and POKEs to Video must be altered (as described in issue number 42). USR routines and "other" PEEKs and POKEs probably mean that the program can't be converted. Several special functions (like INP or ERL) are unavailable on the Color Computer. OUT (if used for sound generation) can be replaced by "built in" Color Computer BASIC commands.

continued on page 62

™TRS80 color

From the January 1981 issue of the CSRA Computer Club newsletter:

> There was some amusement at the November meeting when the Radio Shack representatives stated that the software in the ROM cartridges could not be copied. This month's 68 Micro Journal reported they had disassembled the programs on ROM by covering some of the connector pins with tape. They promise details next month. Never tell a hobbyist something can't be done! This magazine seems to be the only source so far of technical informations on the TRS-80 color computer®. Devoted to SS-50 6800 and 6809 machines up to now, 68 Micro Journal plans to include the TRS-80 6809 unit in future issues.

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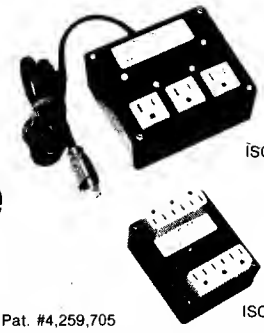

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HOW ACCEL2 WORKS, PART 2

TRS-80 Model I/III BASIC Compiler

The ACCEL2 program has worked fine! I used it to compile a BASIC WORD PROCESSOR that was published in 80 MICROCOMPUTING in their MAY 1980 issue. It was necessary to go through all of the for-next loops because of the many jumps out of them and make corrections,but when that job was done the program worked fine. I am using it to write you this letter. The final program fits into a 32K machine.

ACCEL2 is amazing! I had bought an Othello game a couple of years ago, but never played it because of the interminably long time (2-3 minutes) it took the computer to make each move - no fun at all. Just for the heck of it I ran ACCEL2 on it, making NO changes whatsoever to the program, and the whole thing compiled at once with no tinkering! It then took about 10 seconds per move, so I added a single statement at the beginning to DEFINT A-Z, recompiled, and the result is just as good as an assembly-language program - only a couple of seconds per move!

I also wish to state that I think that ACCEL2 is an excellent product. I have modified Scott Adams' Backgammon game to compile under ACCEL2 as an example. The original BASIC program takes 30 to 40 seconds for the average move and can take as much as 4 minutes. The compiled version averages 2 to 3 seconds per move with a maximum move time of 9 seconds (all integer variables). That is significant!!

I'VE BEEN PLAYING WITH ACCEL2 FOR A FEW HOURS NOW AND IT SEEMS TO BE PRETTY GOOD. FOR EXAMPLE, MY LEVEL 2 VERSION OF RADIO SHACK'S CHECKERS GAME DRAWS THE BOARD IN 19 SECONDS AND MAKES THE SECOND MOVE IN 11 SECONDS. THE COMPILED VERSION DRAWS THE BOARD IN 11 SECONDS AND MOVES IN UNDER 1 SECOND (ABOUT .5). A PROGRAM TO GRAPH CUBIC EQUATIONS TOOK 6 SECONDS PER PLOT, WHILE THE COMPILED COPY TAKES LESS THAN 2.

I HAVE COMPILED ONE PROGRAM I USE RATHER FREQUENTLY: IT EXTRACTS INFORMATION FROM A LARGE DISK FILE (1320 64-BYTE RECORDS PER DISK) AND PRODUCES A REPORT. THE INTERPRETED VERSION OCCUPIES ABOUT 4600 BYTES AND TAKES 18 MIN TO EXTRACT INFORMATION FROM ONE DISK. THE COMPILED VERSION TAKES JUST OVER 3 MIN TO PERFORM THE SAME TASK. SINCE A TYPICAL REPORT INVOLVES ANYWHERE FROM 5 TO 25 DISKS, THIS IS A SUBSTANTIAL SAVING OF TIME.

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ELECTRIC, SIEVE, and HORIZON

Gordon Speer

Electric

Beginners sometimes ask if the computer can figure out an answer just by putting in whatever information is available. Before you grin and say "It's not that easy", consider this short program. It contains a few simple electrical formulas in no particular order, each one preceeded by a statement that won't allow the formula to be used unless enough is known to get a valid result. Since the answer to one of the later calculations might be needed for one of the earlier ones, it is looped to allow three passes (complex sequences might require more). Unknown values are put in as zeros, and any values which are zero cause equations which require them to be skipped. (This should be done routinely in any program before division problems in which the denominator might be zero, since this causes a division by zero error.)

To run the program, enter values for any two of the four parameters, and it will calculate and display all four of them for you.

```
100 'ELECTRIC
110 CLS                          'CLEAR THE SCREEN
120 PRINT,"E  L  E  C  T  R  I  C"
130 PRINT                        'BLANK LINE
140 PRINT "ENTER A ZERO FOR EACH UNKNOWN"
150 INPUT "AMPS, OHMS, VOLTS, WATTS";I,R,E,P
160 FOR T=1 TO 3                 'THREE TIMES THRU THE LIST
170 IF I*R=0 THEN 190            'CAN'T SOLVE THE NEXT EQUATION
180 E=I*R                        'OHM'S LAW
190 IF E*R=0 THEN 210
200 I=E/R
210 IF E*I=0 THEN 240
220 R=E/I
230 P=I*E                        'POWER FORMULA
240 IF E*P=0 THEN 260
250 I=P/E
260 IF P*I=0 THEN 280
270 E=P/I
280 IF R*P=0 THEN 310
290 LET E=SQR(R*P)
300 LET I=SQR(P/R)
310 NEXT T
320 PRINT                        'BLANK LINE
330 PRINT I"AMPERES"             'ANSWERS
340 PRINT R"OHMS"
350 PRINT E"VOLTS"
360 PRINT P"WATTS"
```

The Seive of Eratosthenes

Over 2000 years ago, a Greek geographer named Eratosthenes correctly calculated the size of the earth from the difference in shadow angles at noon in two different cities in Egypt. He is also known for a hypothetical "seive" that allows only prime numbers to fall through, retaining all the factorable ones with imaginary mathematical wires. This program simulates the seive by first displaying all the numbers (up to 256), then sifting out all the multiples of two which are greater than two, then the multiples of three that are greater than three, etc. Delays are inserted to slow down the action so you can watch it work. When it is finished, the only numbers that remain are the primes.

```
100 CLS                          'CLEAR THE SCREEN
110 PRINT,"SEIVE OF ERATOSTHENES"
120 FOR DELAY=1 TO 2000:NEXT     'SLOW IT DOWN
130 CLS                          'CLEAR THE SCREEN
140 DIM C(256)                   'SUBSCQIPTS OVER 10 MUST BE
150 FOR N=1 TO 256               'DISPLAY ALL NUMBERS
160 PRINT @ N*4-4,USING"###";N;  'PUT 'EM IN THE RIGHT PLACE
170 NEXT N                       'MORE NUMBERS, QUICK!
180 FOR N=2 TO 100               'LOOK FOR PRIME NUMBERS
190 IF C(N)=1 THEN 260           'THIS ONE ISN'T
200 FOR DELAY=1 TO 1000:NEXT     'NOT TOO FAST NOW
210 FOR X=2*N TO 256 STEP N      'FIND ALL THE MULTIPLES OF N
220 LET C(X)=1                   'NOT PRIME, KEEP TRACK
230 FOR DELAY=1 TO 10:NEXT       'SLOWLY NOW
240 PRINT @ X*4-4,"   ";         'ERASE THE NON-PRIMES
250 NEXT X                       'LOOK FOR MORE MULTIPLES
260 NEXT N                       'LOOK FOR MORE PRIMES
270 GOTO 270                     'LOCK THE DISPLAY-KEEP BUSY
280 REM COUNTERS FOR ALL 256 NUMBERS ARE USED THIS WAY:
290 REM        C(PRIMES)=0,   C(NON-PRIMES)=1
300 REM THE COUNTERS FOR NON-PRIMES ARE ASSIGNED VALUES OF 1
310 REM IN LINE 220, JUST BEFORE THE NUMBERS ARE ERASED FROM
320 REM THE SCREEN IN LINE 240.
```

Horizon

On the way back from Chicago the other night I noticed that I could pick up the FM station from the John Hancock building for almost 90 miles. The building is 1127 feet high, and the antenna is on top of it. This led me to wonder if this was still "line of sight", or if I was over the horizon, and if over the horizon, how far.

This program allows you to input the altitude of an observer in feet, and it calculates how far away the horizon would be if the earth were perfectly round. The only places where it is that smooth are the oceans and lakes, and the Bonneville salt flats, where you can see telephone poles "marching" over the horizon on a clear day.

To make it super impressive, the answer is displayed in double precision. It isn't actually that accurate, because the square root function is only single

precision, but you don't have to tell your friends if you don't want to.

Does anyone want to send us a double precision square root routine?

How about a computer version of the old square root algorithm?

Typical altitudes to try on this program are:

5 ft	*pedestrian*
50 ft	*apartment roof*
800 ft	*pattern altitude for aircraft*
2000 ft	*television tower*
5280 ft	*one mile up*
36000 ft	*jet aircraft cruising altitude*
500000 ft	*space shuttle*

```
100 CLS                        'CLEAR THE SCREEN
110 PRINT,"   H   O   R   I   Z   O   N"
120 PRINT                      'BLANK LINE
130 DEFDBL A-Z                 'SUPER PRECISION
140 LET PI=3.14159265
150 LET C=4E7            'CIRCUMFERENCE OF THE EARTH IN METERS
160 LET R=C/PI/2         'RADIUS OF THE EARTH IN METERS
170 INPUT "ALTITUDE IN FEET";F
180 PRINT
190 PRINT ,"ALTITUDE","HORIZON"
200 PRINT ," FEET"," MILES"
210 PRINT
```

continued on page 62

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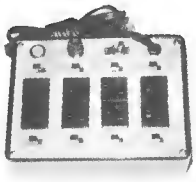

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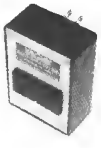

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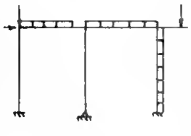

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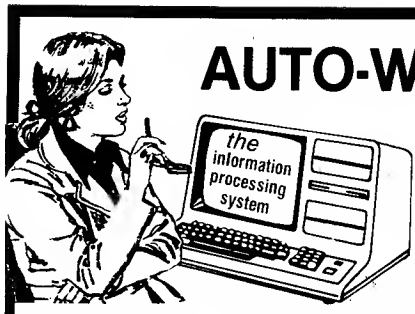

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continued from page 61

```
220 LET A=F*12*.0254            'ALTITUDE IN METERS
230 LET H=SQR((R+A)*(R+A)-R*R) 'DISTANCE TO THE HORIZON,
METERS
240 LET D=H/.0254/12/5280       'WHAT'S THAT IN MILES
250 PRINT ,F,D
260 PRINT : PRINT : PRINT
```

Gordon Speer
3304 Woodlawn Road
Sterling, IL 61081 ■

continued from page 58

I can assure you that there are many programs in BASIC that could be converted for the Color Computer. If you are new to computers, you might want to select programs that don't require Video changes (through PEEKs and POKEs), since this is one of the more complicated changes that could be made. The more common Integer to Real changes described above are fairly straightforward. Program rewriting is an excellent way to learn about your computer. Of course, you can always write your own programs. If you do, you might want to send them in to *Computronics*. We are always looking for new programs to publish!

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Covers events such as marriage, divorce, birth, death, employment, lay-offs, retirement, travel, change of residence, accidents, illness or injuries, business ventures, self-employment, education, investments of money or time, prizes, scholarships, insurance recoveries, tax-exempt income, bad debts, etc., as well as the commonly known income items and deductible expenses.

Program also carries out computations for depreciation schedules, joint vs. separate returns, itemized vs. standard deductions, depreciation vs. tax credits, etc., in order to help make important tax decisions. Includes 1981 Tax law changes, references to related areas such as gift and inheritance taxes, trusts, estates, partnerships, corporations, pension and retirement plans, tax-exempt organizations, etc. Includes booklet of useful IRS tax forms, other tax publications, and toll-free phone number of tax attorney. Available on cassette or diskettes for most popular micros. Price $49.95

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- POS Daisy-Wheel Printer Interface for TRS-80 Model I . $249.95
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continued from page 55

patterns to digital patterns that are recognizable by the CPU. Actually, the driver program is divided into 3 sections. The INITIALIZATION part clears the speech files and resets the speech sample tables to zeroes. The TRAINING section accepts spoken words and extracts the patterns from these spoken words and are stored for comparison. The RECOGNITION section that takes the spoken word patterns and compares them with the ones stored in memory.

Technically speaking, the VOXBOX is a speaker-trained, isolated-word speech recognition system with a 32-word vocabulary. "Speaker-trained" means that the user must enter one or more examples of each word or phrase in the vocabulary. This is done during the "training" portion of a program, where the program will prompt the user to speak the chosen vocabulary words into the microphone. Then the patterns are stored for later comparison.

"Isolated word" means that each word or phrase must have a .1 second period of silence before and after the word. This is necessary to allow the computer to determine when a word has started and when it has finished.

So, if you ever wished you could just talk to your TRS-80, what you really need is a VOXBOX! Next time, we'll cover how to get your computer to talk back!!

DICTIONARY OF COMPUTERESE

SPOOL: (a wooden device for storing thread or twine?) an acronym for Simultaneous Peripheral Operations On Line.

Read-Only Memory (ROM): A memory in which the contents are not intended to be changed during normal operation. Your Level II BASIC is stored permanently here.

Data: any or all facts, numbers, letters, symbols, etc., that can be processed or produced by a computer; information.

Raw Data: (Is this anything like uncooked meat?): Data that has not been processed; they may or may not be in machine-readable form.

Interrupt: (what children do while you are busy?) a break in the normal flow of a routine that can later be resumed. An interrupt is usually caused by a signal from an external source (light pen, children?)

CPU (Central Processing Unit): A microprocessor (Z-80) built with large scale integration technology often contains a CPU on a single chip.

Sherry M. Taylor
322 South 21st Street
Haines City, FL 33844 ■

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space is taken up before you enter your first BASIC statement line. CONVERT is also a stand-alone program.

XFERSYS is an undocumented and fairly useless program to be included on all system diskettes(It would appear that the purpose of this program is to transfer the operating system to a formatted diskette, but this purpose has been rendered impossible by the fact that the system files are not included in the disk directory but simply scattered around the disk. If you run XFERSYS with a system disk in drive 0 and a formatted disk in drive 1, what you will accomplish is to copy BASIC, CONVERT, and XFERSYS itself to drive 1. (This could have been done more efficiently by means of a DO file.)

File 10, LPC/CMD, is a small program that modifies the line printer driver in ROM in order to make different printers compatible. (It does not actually modify ROM, but sets values in the line printer's DCB area.) If your line printer does not advance to a new line upon receiving an LPRINT command with no text following it (just a null LPRINT), then you may need to use LPC. Its basic purpose is to make newer printers work like older ones, which did not have as many control commands. To use it, you simply type "LPC", and once it has run the space that it occupied can be reclaimed.

MEMTEST is a program that performs a few diagnostic tests on your ROM, RAM, and video display.

HERZ50/BLD is meant only for persons using the computer in foreign countries where the electric power is 50 Hz instead of 60Hz which it is in the United States. If you do not plan to do this, it is best to delete this file lest you execute it (it is a DO file) inadvertently.

Files 13 and 19 simply contain the error messages for BASIC and the DOS, respectively. File 21 executes the HELP command, and note how extensive it is. This is very useful enhancement to the DOS, and if you haven't used it yet, you should try it. You can even HELP HELP!

File 16 is the DOS command interrogator, which means that this is the file that takes what you have typed and examines whether it represents either a DOS command or the name of a file to be executed. It is very short, but the command executing modules, files 20, 22, and 23, are not. (File 4 should also be considered a DOS Command Executor.)

File 20, DOS Command Executor (1), executes all of the following commands: ZPPEND, ATTRIB, AUTO, BUILD, CLEAR, CLOCK, CREATE, DATE, DIR, DO, DUMP, FREE, LIB, SOAD, PAUSE, PROT, RENAME, and TIME. It uses through location 6240, bkt the LOAD command uses only through 585D, so that you can LOAD a program into memory above this address. If you try to load something after that, however, you will need through location 5FC4. Fortunately, if you just want to execute a program (by typing a file name), the system uses only up the area below 5200, so that this is the lowest address for user programs).

File 22, DOS Command Executor (2), executes the commands COPY, DUAL, FORMS, KILL, MASTER, PATCH, RELO, ROUTE, SETCOM, and WP. File 23, the third DOS Command Executor, executes only TAPE, LIST, and PURGE.

I hope that this discussion has given you some insight into how TRSDOS works in a more detailed manner than before. We will continue with this subject and related areas in the future

Form **1040** Department of the Treasury—Internal Revenue Service
U.S. Individual Income Tax Return 1981

For Privacy Act Notice, see page 3 of Instructions | For the year January 1–December 31, 1979, or other tax year beginning , 1979, ending , 19

Use IRS label. Otherwise, please print or type.	Your first name and initial (if joint return, also give spouse's name and initial)	Last name	Your social security number
	Present home address (Number and street, including apartment number, or rural route)		Spouse's social security no.
	City, town or post office, State and ZIP code	Your occupation ▶ / Spouse's occupation ▶	

Presidential Election Campaign Fund			
▶ Do you want $1 to go to this fund?	Yes	No	Note: *Checking "Yes" will not increase your tax or reduce your refund.*
If joint return, does your spouse want $1 to go to this fund? . . .	Yes	No	

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The manual includes information on special tax areas, lists of possible deductions and a tax glossary.

TAX/SAVER™ compares itemized deductions to national averages; automatically computes certain limitations - for example, on medical deductions and contributions; checks for excess FICA; helps determine dependents. Yet, TAX/SAVER™ offers the privacy and convenience of home use.

The user-oriented design with special screen formatting makes data entry, verification and correction easy. Yet you are always in control. You can skip any help features or parts of the program that you don't need.

TAX/SAVER™ II completes long and short forms including:

- Itemized Deductions - Schedule A
- Interest & Dividends - Schedule B
- Tax Calculation - Tables, Rates
- Tax Saving Methods - Income Averaging, Maximum Tax, Alternative Tax
- Business Income - Schedules C & SE
- Capital Gains - Schedule D
- Allows you the privacy of your own home
- Lets you help friends and relatives with their taxes
- Has built-in aids. Answers specific questions like "Is my father my dependent?" and "Are my deductions reasonable?"
- Tax deductible
- Manual includes 1981 tax forms, information on special tax areas, lists of possible deductions, and glossary of tax terms
- Completes long and short forms including itemized deductions, excess FICA, earned income credit, community property, tax calculation (comparing all possible filing statuses in one run)
- Tax regulations are programmed in by our team of accountants. Just type in your figures and you've done your own tax return.
- Helps you find the lowest tax
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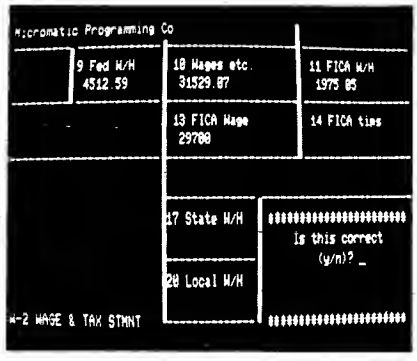
- Prints out on standard IRS forms overlays or plain tractor feed paper



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GENERAL LEDGER

Processes

- ★ Flexible design allows system to be easily adapted to both small businesses and also to firms performing client writeup services.
- ★ Add, change or delete records within the Chart of Accounts (Master) File.
- ★ List the Chart of Accounts File.
- ★ Key in transactions into the Transactions (Journal Entries) File.
- ★ List the Transactions File.
- ★ If other Peachtree Software packages are present, pass summary transactions from these packages to the General Ledger at the end of the accounting period.
- ★ At the end of an accounting period, print out the major reports:
  - (1) Trial Balance (Detail Report)
  - (2) Transaction Registers
  - (3) Balance Sheet
  - (4) Prior Year Comparative Balance Sheet
  - (5) Income Statement
  - (6) Prior Year Comparative Income Statement
  - (7) Department Income Statements

File Information

There are two main computer files maintained within the General Ledger System.

(1) The of Accounts File
- Account Number
- Description
- Account Type
- Balance Sheet Column Code
- Current Amount
- Year-To-Date Amount
- Budget Amount
- Prior Year Monthly Amounts

(2) The Transactions File
- Account Number
- Description
- Source Code
- Reference
- Date
- Amount

ACCOUNTS RECEIVABLE

Processes

- ★ Add, change or delete records within the Customer File.
- ★ List the entire Customer File, or any Customer within the File.
- ★ Enter invoices, payments, credits and adjustments.
- ★ Prepare invoices and statements.
- ★ Produce the following reports:
  - (1) Aged Accounts Receivable
  - (2) Invoice Register
  - (3) Payment, Credit and Adjustment Register
  - (4) Customer Account Status Report
- ★ At the end of a month, post the following items to the General Ledger:
  - (1) Invoiced Sales
  - (2) Freight Charges
  - (3) Sales Tax
  - (4) Service Charge Income
  - (5) Cash Payments
  - (6) Discounts Allowed
  - (7) Returns/Credits
  - (8) Income Adjustments
  - (9) Accounts Receivable

File Information

There are three main computer files maintained within the Accounts Receivable System, the Customer File, the Invoice File, and the Transaction File.

CUSTOMER FILE
- Customer Account Number
- Customer Name
- Address
- Phone
- Type of Account
- Credit Terms
- Credit Limit
- Tax Rate
- Discount Rate
- Date of Last Credit
- Date of Last Debit
- Amount of Last Credit
- Amount of Last Debit
- Current Balance
- High Balance
- Year-To-Date Sales
- Year-To-Date Payments
- Automatic Billing Amount

INVOICE FILE
- Invoice Number
- Invoice Date
- Invoice Amount
- Credit Terms

TRANSACTION FILE
- Transaction Type
- Transaction Date
- Transaction Amount

ACCOUNTS PAYABLE

Processes

★ Add, change or delete records within the Vendor File.
★ List the Vendor File.
★ Enter vouchers.
★ Automatically determine which vouchers to pay.
★ Print checks and a Check Register.
★ Produce the following reports:
  (1) Open Voucher Report.
  (2) Accounts Payable Ageing Report.
  (3) Cash Requirements.
★ At the end of a month, prepare the General Ledger Transfer File, passing the following information for each debit or credit transaction:
  (1) Account Number
  (2) Description
  (3) Source Code
  (4) Date
  (5) Amount

File Information

There are two main computer files maintained within the Accounts Payable System, the Vendor File and the Voucher File.

VENDOR FILE
- Vendor Code
- Vendor Name
- Address
- Phone
- Year-To-Date Purchases
- Year-To-Date Payments
- Current Balance
- Last Payment
- Date of Last Payment
- Monthly Entry Flag
- Due Date of Month
- Debit Account Number
- Amount (Debit)
- Month Last Paid

This file may also contain information to enable generation of automatic vouchers for those items such as rent or bank payments that are paid every month.

VOUCHER FILE
- Voucher Code
- Voucher Date
- Amount Due
- Date Due
- Discount Percent
- Discount Amount
- Discount Date
- Invoice Number
- Invoice Date
- Status

Plus up to six account number-amount fields for General Ledger account numbers to which the amount due is to be distributed.

PAYROLL

Processes

★ Add, change or delete records within the Employee File.
★ List the Employee File.
★ Modify the Tax Information Files.
★ At the end of a pay period -
  (1) Calculate Pay
  (2) Print Checks
  (3) Print Payroll Register
★ At the end of a month -
  (1) Print the monthly summary
  (2) Print the Unemployment Tax Report
  (3) Prepare the General Ledger Transfer File, passing the following information:
    - Net Pay (Cash)
    - Employee FICA Withheld
    - Federal Tax Withheld
    - Insurance Deductions
    - Miscellaneous Dedutions
    - State Tax Withheld
    - Local Tax Withheld

  The gross pay for up to twenty payroll departments may also be passed to the General Ledger.
★ At the end of a quarter, print the 941A report information.
★ At the end of a year, print the W-2 forms.

File Information

There are two main computer files maintained within the Payroll System, the Employee Master File and the Tax File.

EMPLOYEE MASTER FILE
- Name
- Address
- Local Code
- State Code
- Marital Status
- Exemptions, Federal
- Exemptions, State
- Social Security Number
- Pay Period
- Pay Type
- Pay Rate
- Insurance Deduction
- Miscellaneous Deduction
- Date Employed
- Date Terminated
- Last Check Information

Payroll (con't)

And current, month-to-date, quarter-to-date and year-to-date totals for:
- Regular Earnings
- Overtime Hours/Earnings
- Other Hours Rate/Earnings
- Commission Earnings
- Miscellaneous Income
- FICA Deductions
- Federal Deductions
- State Deductions
- Local Deductions
- Insurance Deductions
- Miscellaneous Deductions

TAX FILE
(for single and married persons)
- Federal Tax Information Tables
- State Tax Information Tables
- Local Withholding Tax Information Tables

An Overview of the Inventory System

Inventory is probably the most speculative of all of a company's assets. A true measure of the effectiveness of management is the ability with which it supervises the inventory control function.

The Peachtree Software™ Inventory Management System is designed to (1) give you better merchandise control, (2) allow you to lower your dollar investment in inventory, and (3) improve customer service and response.

The System maintains detailed information on each inventory item including the part number, description, unit of measure, vendor and reorder data, item activity, and complete information on current item costs, pricing, and sales. Transactions effecting inventory (sales, receipts, adjustments) may be applied at any time to insure the inventory data is always up to date and accurate.

As with all Peachtree products, the system is interactive, simple to operate, and provides reports that are up to date and comprehensive.

Particular features of the Peachtree Software™ Inventory Management System include:

- Interactive, menu-driven programs
- Self-instructing user documentation
- Long item number - up to 15 characters
- Departmentalizing of items
- Multiple pricing levels
- Processes items on reserve (committed but still in stock)
- Online item query at any time
- Comprehensive management reporting
- Automatic month end file backup
- Recovery routines for hardware failures
- Sample data for demonstration and training

How the System is Designed

The Inventory Management System operates with an **Inventory Master File** which allows for the creation of each inventory item and for the recording of transactions (sales, receipts, returns, reserves, and adjustments) to each inventory item.

The Inventory Master File contains the item number, description and various other data on item costs, prices, reorder levels, vendor refereence, and activity. The items within the Master File are entered, changed, deleted, and queried through the **Inventory Master File Maintenance** program. All data on all items may be listed by using the **Detail Inventory Report** program.

Transactions may be applied at any time to the Master File through the **Enter Inventory Transactions** program. An **Update Report** automatically prints during this entry process to provide an audit trail of all inventory acitivity.

Several reports are available for the maintaining of stock, analysis, and forecasting. These reports include the **Physical Inventory Worksheet, Inventory Price List, Departmental Summary Report, Inventory Status Report,** the **Reorder Report** and the **Period-to-Date** and **Year-to-Date** reports.

At the end of an accounting period (usually a month), and then again at the end of a year, the **End of Period Processing** program is run to update current balances and clear previous balances.

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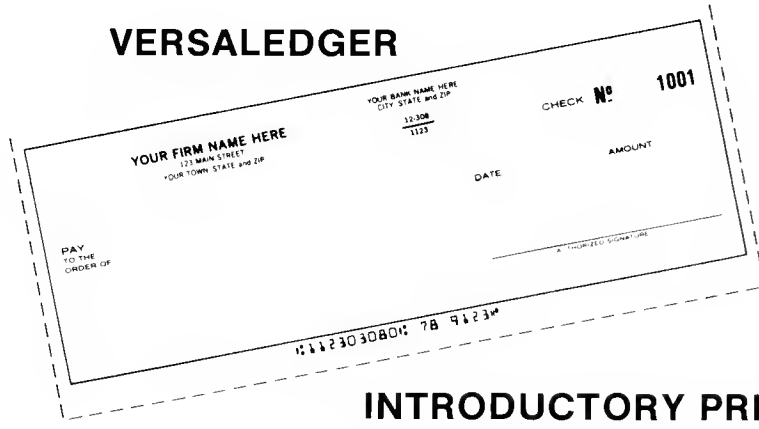

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